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THE

Ophthalmic Review

THE

Ophthalmic Review

A RECORD OF OPHTHALMIC SCIENCE.

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KERATITIS PROFUNDA.*

By W. T. Holmes Spicer.

Many cases of interstitial keratitis are met with in which no trace or history of syphilis, congenital or acquired, can be obtained; in which the local changes resemble each other, but in which the causes vary greatly, or cannot readily be discovered. I have put together fifty-four of these cases in which the observations have been fairly complete and continuous, and it appears to me from an examination of these cases that this disease stands out as a distinct clinical entity. Of the 54 cases, 34 occurred in males and 20 in females, the difference being accounted for by habits and occupations, chiefly by the greater liability to injury in the males and by their greater addiction to alcohol. The occupations have been most various, and no deductions can be drawn from them. I find that the average age of all the patients taken together is 40; the oldest patient was 65.

Investigating the habits and personal health of the patients, eight admitted taking alcohol in excess; nearly all took alcohol, and very many took what was undoubtedly too much; ten of them drank beer in excess, two of them were brewers' men, and one a potman of almost unlimited capacity for beer. Nearly all the most acute and severe cases occurred in this group. Over-eating is less easy to identify, but it was clearly present in some cases, combined generally with over-drinking, especially of beer. Nine patients had typical gout, seven others were subject to rheumatism or rheumatic pains, one to sciatica. Disturbances of the intestinal tract, fæcal retention, or chronic constipation with indigestion, were present in seven cases;

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* Read at the meeting of the British Medical Association in Oxford.

carious teeth or pyorrhœa alveolaris were found in four cases; dysentery was present in two cases; four of the cases occurred just before or after the termination of pregnancy. Some patients were broken in health or prematurely old, ill-nourished, with blueness of the extremities, with defective circulation, or were the subjects of chronic bronchitis. Finally, there was a small number who seemed to be in perfect health, were abstemious and regular in habits, but who inherited a strong family history of gout. Seven cases seem to have been actually started by an injury, such as an abrasion, a slight blow or a foreign body. To sum up, over-eating and drinking and their results in the individual or descendants in the form of gout and rheumatism, with defective intestinal hygiene, were responsible for 40 cases, or just three-quarters of the total number.

The duration of the disease was noted in 45 cases; it was reckoned from the first appearance of symptoms till the disappearance of all congestion. The average time was three months, the slightest case only lasted three weeks; the longest, 12 months, was in a woman who insisted, against all advice, in suckling a child till it was 18 months old. The duration of the opacity was of course much longer. The right and left eyes were each affected 27 times, and both eyes were involved five times.

The final results as regards vision are frequently not stated, the case terminating and the patient ceasing attendance when the irritation was at an end, but in nine cases the final result was $^{5}/_{6}$, in two it was $^{6}/_{9}$, in one it was $^{6}/_{12}$. Judging from the amount of opacity present when last seen a number of patients would suffer from more or less permanent damage, but in the less severe cases the prognosis is good.

As regards local changes, moderate ciliary congestion comes on soon after the first complaint of dimness of sight; it is generally dusky in colour and rarely severe. The greatly swollen limbus, rising above the level of the cornea, and the dense salmon patch, I have never seen. Quite early, in the first few weeks, especially in the cases beginning at the edge of the cornea, blood-vessels spring from behind the scleral edge, and run towards the centre of the cornea, but they can be seen as separate vessels. The opacification of the cornea takes one of two forms—the central disc and the peripheral cone. In the disc form a grey opacity forms in the centre of the deepest part of the cornea, occupying about the central half or third; the disc is sometimes less dense at the centre than at the periphery, so that there is an opaque ring surrounding the comparatively clear centre; or the central disc may be surrounded by a ring of maculæ which may coalesce into a complete ring surrounding the disc. In the peripheral conical form the opacity starts from the margin of the cornea and advances towards the centre; the base of the cone was downwards in 12 cases, upwards in seven, twice it was to the outer side, and once to the inner. The disc opacity occurred in 25 cases, the conical form in 22; in a few cases the two kinds were mixed. If the opacity of the cornea be examined under magnification at its first appearance it will be seen to consist of fine striated lines, "striated keratitis," which was seen in 34 cases. In the disc form the striated lines run for the most part vertically with a tendency to radiate from the centre; in slight cases, limited to the centre of the cornea, the lines radiate strictly in all directions from the centre. In the marginal form the striation is marginal also, and appears as delicate fingers of opacity extending from behind the scleral edge of the cornea directly inwards towards the centre. The lines are somewhat uneven in outline, sometimes they cross or intersect one another; sometimes they are extremely delicate, and appear to have a double contour suggesting a tubular structure. The striation of the cornea is a very early sign, and is helpful in determining the nature of the affection.

Very soon the striation disappears or is hidden by the increasing opacity of the cornea just in front of it. The actual opacity of the cornea occurs either as a uniform layer or as a number of delicate gray maculæ situated in the deep layers. These maculæ are to be distinguished from deposits on the back of the cornea by their colour, grey, as distinguished from yellow, and by their having a less sharply defined edge; as the disease progresses the maculæ increase in number and size, and unite more or less into one grey layer. In the peripheral form, as the uniform grey layer advances over the cornea, it is often headed by a skirmishing line of grey maculæ.

Œdema of the cornea is almost always present; it shows itself by the surface being slightly uneven, appearing when magnified like the skin of an orange, or as the books say, like shagreen. Very often, in addition, there appear to be little bullæ on the surface, like clear black drops; these are sometimes fairly large, and if two or more adjacent bullæ give way an appearance of superficial ulceration arises.

If a drop of fluorescein be placed in the conjunctival sac and allowed to remain there for a few minutes before being washed out, in certain cases the deepest part of the cornea appears to take on a delicate green stain; it is even possible to determine exactly the seat of the stain, either by the hand lens or by the corneal microscope. In such a case the level of the various changes in the cornea can be made out without much difficulty. There is first of all the surface epithelium shown by its bullous appearance; next below that, but separated from it by clear cornea, there is the central disc of grey or white exudation, beginning at a variable depth below the surface and extending back to the deepest layers of the *substantia propria.* This does not stain; behind this again are the lines of striation which do not stain, then comes the layer which stains, generally larger than the opaque disc in the cornea, and except for the staining often appearing quite transparent and normal. This is the layer of endothelium, changed by disease; it takes on the stain from the fluorescein in its passage through cornea, or from the aqueous into which it has been absorbed from the conjunctival sac; the latter method is the more probable one, as the same result is obtained if the fluorescein is injected beneath the conjunctiva, and does not touch the cornea at all. The deep staining results are not always obtained; there is a certain period in the course of the disease only when the endothelium stains; either before or after no staining takes place. The endothelium is capable of very rapid regeneration, in a few days it can be entirely replaced. On the other hand the possibility of deep staining may last for a long time; in one case I have found it present for at least a month.

As far as my observations go it is the central disc form in which the staining is most readily obtained. Sometimes the staining is patchy and incomplete, sometimes it is only punctiform; once while observing the cornea under strong magnification, after the use of fluorescein, I saw a number of green dots appear on the back of the cornea; these did not become larger at the time, but a week later the whole central part of the posterior surface of the cornea stained uniformly. I have seen this punctate staining in three other cases in which, however, there were punctate deposits on the back of the cornea. Deposits on the back of the cornea do not stain, or if they do they are opaque, and do not show their posterior or stained surface.

In 34 cases iritis was not present, that is the pupil dilated quite easily and well with one application of Atropine, and left no pigment on the lens: Iritis was present in 14 cases. Deposit on the back of the cornea or keratitis punctata was present in 21 cases and was stated to be absent in 30; in some cases it appeared late, in one case after 4 weeks. In one case there was a sectorial atrophy of the iris left behind, the upper outer part being left thin, grey, fibrous and somewhat drawn up; in this case increased tension had been a marked feature of the case throughout. The tension in the eye was raised in 4 cases.

The extreme periphery of the fundus has been examined in many cases both at the beginning and after recovery, but nothing has been seen except in one case in which a young man, aged 18, after a prolonged attack of diarrhœa suffered from widespread retinal phlebitis in both eyes; the veins all over the retinæ were sheathed in white, the bands on each side of the vessel appeared to be almost as wide as the blood column; towards the extreme periphery there were widespread hæmorrhages. About 6 weeks later he developed a patch of interstitial keratitis at the outer side of his right eye.

Before considering the pathology of deep keratitis as a whole we must explain the meaning of the various things seen in the cornea. A marked feature of the disease is the œdema of the cornea; this shows itself chiefly in the swollen and bullous appearance of the surface. The epithelial cells are all more or less distended with fluid, and the swollen cells project on the surface as small vesicles; the inter-cellular spaces are also distended, and the large bullæ are formed by the separation and lifting up into a bleb of one or more layers of epithelium. The substantia propria of the cornea is also œdematous, but this cannot be recognised.

In the posterior part of the cornea the striated lines are evidence of œdema also; these lines are almost certainly produced by wrinkles in Descemet's membrane caused by œdema of the posterior part of the cornea; in the disc-like form of deep keratitis the œdema is general, the wrinkles occupy the centre of the cornea; in the peripheral form the wrinkles are limited to the affected part. The double contour sometimes assumed by the striated lines suggests a tubular formation in the cornea; any tubular formation in this situation is, however, difficult to explain, and the appearance must in some way be due to the action of light on the curving surface of the folds.

The deep layer which stains with fluorescein lies behind the striated lines, and is due to colouration of the layer of endothelium; the cells are cast off at first individually, and afterwards in numbers, leaving a denuded surface which stains with fluorescein taken up from the aqueous into which it has been absorbed from the conjunctival sac.

The denudation of the posterior surface of Descemet's membrane by the casting off of its endothelium leaves the back of the cornea unprotected; the aqueous fluid gains access to the posterior layers of the substantia propria of the cornea, and gives rise to the irritation, inflammation and exudation of cells in that situation (Leber). This exudation is either in the form of separate colonies of cells producing the maculæ, or it forms a continuous layer, the discoid or peripheral conical opacity characteristic of the disease.

The experiments of Wagenmann, Koster and v. Hippel carry us a step further in explaining the possible origin of the changes in the cornea which have been already discribed.

Wagenmann (*v. Graefe's Archiv*, 1890, iv.) found after section of one long ciliary artery with some of the neighbouring short ciliary arteries in the rabbit that there was in some cases a spontaneous partial parenchymatous opacity of the cornea. Microscopically the cornea remained for the most part intact, but there were seen in the first stage clear but trifling changes in the endothelium. Twelve hours after section of both long ciliary arteries a diffuse grey-white opacity appeared at the margin of the cornea, and quickly pushed its way towards the centre, involving finally the whole cornea. After a few days the cornea was invaded by vessels running in its substance. The appearances were exactly those of interstitial keratitis.

W. Koster (*Graefe's Archiv*, 1895, ii.), after ligature of the four venæ vorticosæ, found the whole cornea invaded by closely packed spots and streaks; these increased quickly and produced a typical parenchymatous keratitis; on the third day vessels began to invade the cornea. With ligature of two or three venæ vorticosæ only a slight opacity appeared at the margin of the cornea.

v. Hippel (*Graefe's Archiv*, 1903, iii.) found, after ligature of the four venæ vorticosæ, as well as after section of the long ciliary arteries in the rabbit, that after 22 hours the cornea became slightly hazy, stained in its deepest layer with fluorescein, and when excised gave an intense blue colouration in the same layer with methylene blue.

He found microscopically that in these cases the endothelium was imperfect in the stained region.

As parenchymatous keratitis can be produced experimentally by interference with the blood supply, it is probable that in keratitis profunda, a variety of parenchymatous keratitis, the true seat of the disease is in the nutrient blood-vessels, and that the different forms which it manifests may be due to the different vessels affected, not necessarily the long ciliary arteries or the venæ vorticosæ, but the vessels which more directly supply the cornea.

As to the treatment, in addition to hot fomentations, atropine should be used, with complete rest of both eyes and protection from light. In the few cases in which the tension is raised, atropine should be used only with caution and where the patient can be kept under close observation. Eserine may be used tentatively in such cases; sometimes it is beneficial, but it often tends to increase the irritation. In such cases, where the tension is dangerously high, paracentesis may be done. I have done iridectomy in two cases; in one of them the result was not satisfactory, for the cornea became completely opaque, the eye remained irritable and was eventually excised for pain. In the other case, complicated with posterior synechiæ, the result was at once beneficial. Peritomy was done in one case also without benefit. If vascular disease be the true cause of the disease one could hardly expect peritomy to be anything but harmful.

I have used subconjunctival injections of cyanide of mercury 1 in 1,500; in the acute stage I have found them to produce a great deal of inflammatory reaction and to be harmful; in the later stages they are unnecessary. Subconjunctival injections of normal saline I have found of no value. Dionine is well spoken of in the later stages, but I have not found any very marked benefit from its use. What is of the greatest importance is the general treatment. The cause must be sought for. Strict dieting both in quantity and quality must be secured; in cases of alcoholic excess, abstention; beer and sweet wines must be forbidden. For the relief of constipation, regular doses of mercurial pill, and especially the dilution and washing out of the fluids of the body by the drinking of large amounts of water, hot or cold. This is especially valuable in those who suffer from defective circulation. Some cases do well with regular doses of mercury, but as a rule they do equally well without it.

A SIMPLE "EYE-SOCKET" FOR USE IN DEMONSTRATING OPERATIONS ON EXCISED EYES.

By N. Bishop Harman, London.

Recently I had the necessity of demonstrating an operation on the globe; instruments were at hand and some pigs' eyes, but there was no "phantom" or a convenient arrangement wherewith to hold the eyes. A device was, however, hit upon which proved so satisfactory that I think it may well be noted for the convenience of those teaching students where more than one of the excellent but rather costly phantoms in use is not available.

From the hospital dispensary a cardboard box 4in. by 3in. by 1½in. was secured, and from the store a bar of yellow soap. A slab of the soap was cut to fit within the box. A hole about the size of a palpebral fissure was cut in the lid of the box, and a "socket" scooped out from the block of soap immediately below the position of the hole in the box-lid. The wet eye was put into the soap socket, covered with the lid, and the lid secured in position by a couple of elastic bands. The result was excellent. The slippery, soapy surface allowed of free mobility of the eye, so that the handling of fixation forceps and cutting instruments was as nearly akin to that required on the living eye as possible.

PRESENT VIEWS REGARDING THE ORIGIN OF THE VITREOUS.

By Prof. Cirincione, Genoa.

Part III.

Before closing this retrospect on the origin of the vitreous I must note one point of great importance in the study of the embryonic vitreous, and that is the division into a solid part (the fibrillary network) and into a fluid part. The authors, with the exception of Virchow, are only occupied with the study of the former, and only in the work of Kölliker do I find a brief though precise allusion to the two divisions, and to my satisfaction he states that "the ciliary region is the principal source of the fluid of the vitreous which is derived chiefly from the vessels of the ciliary body." According to my researches the fluid part of the vitreous is the only part of the vitreous derived from the retina. "The vitreous humour (I wrote in 1892), that is that sticky substance held in the meshes of the network, appears to be a product of the most peripheral part of the secondary optic vesicle, which is here very soon reduced to a single layer lined externally by the pigment layer. The importance of this region as the source of supply of the fluid constituents of the vitreous is seen in the disastrous consequences that follow to the globe of the eye in lesions of the region."

The network is essentially a mesodermic product, but while it is easy to convince oneself of the relationship of the vitreous with the mesoderm in mammals (at first across the optic fissure and perilenticular space and then later only across the latter), yet this is not so easy in the lower vertebrates, particularly among amphibians, some fish and reptiles. In them one meets very few fibrils and few or no mesodermic elements in the secondary optic vesicle, hence the influence, apparently justified, that as there was no mesoderm in the vesicle the fibrils of the vitreous could not be derived from them. But in the secondary optic vesicle of the lower vertebrates at the time the vitreous is forming, the optic fissure is not formed so early as in mammals or in the same way (Figs. 18 and 19), and the cavity of the vitreous remains widely open (Fig. 20), and therefore in relation with the mesoderm, which sends into it fine filaments which constitute the network of the vitreous without penetrating deeply into it.

When the fœtal vitreous has reached its full development it presents a thick network with fine meshes. Slowly as the cavity grows the fibrillæ lengthen (they do not increase in number) and the meshes enlarge so as to hold a larger quantity of fluid, and it is due to this fact that the growth in volume of the globe follows and not to the multiplication or increase in the network. In the adult vitreous when this network is destroyed by pathological processes (hæmorrhages, myopia, choroiditis, etc.), it is not regenerated.

One last point and I close these remarks. When one considers the physiological, pathological and histological properties of the adult vitreous one must admit that it behaves like an ectodermic structure (absence of inflammation, vessels and tumour formation, etc.), but these are not enough to determine an epidermic structure, since as is well known the vitreous of mesodermic origin only consists of the network, and this is in the adult vitreous proportional to the fluid of the vitreous (which is an ectodermic secretion), thus making it an almost negligible quantity. This network is besides formed only of fibrillæ destitute almost altogether (Kölliker states completely) of cellular elements and cut off altogether from the mesoderm from which it arose. It is therefore comprehensible that the adult vitreous does not run *contra* to the physiological and pathological manifestations that are observable in all tissues.

APPENDIX.

To complete this review on the origion of the vitreous I have added the report of the discussion which took place at the Heidelberg Congress, following upon Prof. Kölliker's and my communications, and in which some eminent embryologists took part.[1]

Meeting on the 31st March, 1903.

Prof. Waldeyer considered that *a priori* one considers that the mesoderm takes part in the formation of the vitreous, as otherwise one would not be able to explain those pathological changes that occur in bony formations in the vitreous, and bone has never been considered as an ectodermic structure.

Prof. Bencke referred to a case published by Dr. Lange in which the vitreous was replaced by adipose tissue.

Prof. Benda said that he had noticed cartilage in the vitreous.

Prof. Merkel asked if Prof. Cirincione had used Golgi's method in studying the vitreous.

Prof. v. Ebner compared the vitreous to the tissue of the central nervous system.

Prof. Rabl admitted this comparison and stated that he viewed the vitreous as a retinal product only in the same way that the central nervous system is admitted as a purely ectodermic formation, though it contains, without doubt, some mesodermic tissues (vessels and peri-vascular tissue), and therefore he concedes the pressure of mesodermic elements in the vitreous. He denies altogether the views held by Lenhossek.

Prof. H. Virchow asked Cirincione if the fibrillæ of the vitreous formed a network. In favour of which view—which he has always supported,—he stated that the network of the adult ox's vitreous is able to support the weight of a pair of forceps and scissors.

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[1] I have translated literally the abstract as published in the *Ophthalmologische Klinik* of July, 1903, but I give the whole of my reply (from the official report) as clearing some points passed over in the above paper.

Prof. Retzius rejected the reticular disposition of the fibrillæ of the vitreous, and holds that they form only a matting together. Golgi's method he found of no use.

Prof. Nussbaum denied in the case of fishes the retinal origin of the vitreous, as in them the vitreous is without doubt of mesodermic development.

Prof. H. Virchow drew attention to the peculiar features of the vitreous of fishes, whose chemical nature is very varied, besides possessing a marked mucous consistence.

Dr. Van Pée was not able to deny a participation of the mesoderm in the formation of the vitreous, which is essentially, however, derived from the retina and the lens.

Prof. Cirincione thought that he was going to be left alone in upholding the mesodermic origin of the embryonic vitreous, and it therefore gave him great pleasure to learn that such authorities as Waldeyer, Benecke, Arnold, Nussbaum, Benda, etc., were not carried away by the new theory, especially when this had received the support of such a distinguished embryologist as Rabl, who had declared himself in favour of the retinal origin. Prof. Kölliker, not wishing to discount anyone, held that the embryonic vitreous was derived equally from the ectoderm and the mesoderm, thereby neglecting perhaps somewhat the mesodermic tissue so well illustrated in his drawings and better still in his fine preparations.

Replying to Prof. Waldeyer, Cirincione stated that the mesodermic elements persist in the vitreous, thus explaining the bony new formation seen by him. He confirmed what Prof. Retzius stated regarding Golgi's method as applied to the study of the embryonic vitreous, though he met with success in the use of Van Gieson's method. He offered to demonstrate preparations where the vitreous stroma has taken the mesodermic colouring, thus differentiating itself from the ectodermic tissue. To Prof. Benecke's opportune case must be added that of Prof. v. Hippel, in which the vitreous in a case of coloboma of the choroid shows a great quantity of mesodermic tissue. While one is discussing the pathology of the vitreous he wished to be allowed to refer to glioma, which so frequently develops in the retina of infants. This tumour never invades the tissue of the vitreous, and in whatever state of development, as long as the contents of the eye are recognisable, the hyaloid membrane and the limiting membrane lie always superficial to the tumour. Now one can not understand the reason why glioma, which is a true retinal growth, should not invade the vitreous if this latter were a retinal tissue.

Prof. v. Ebner made a comparison between the vitreous and the central nervous system, but he (Circincione) did not think that the vitreous is a tissue that can be compared to any other in the animal organism. He holds that it is necessary to study the development of the vitreous by examining the vitreous not only in one, but in an infinite number of its different embryonic stages, otherwise the result will be theories and not facts.

The principal argument, as Prof. Retzius noted, which has induced authors to take up the ectodermic origin, is furnished by that substance described by Lenhossék and Van Pée, lying between the lenticular vesicle and the optic vesicle of mammals, and which appears at the time the latter is forming the secondary optic vesicle. This substance is composed of prolongations from the retina and lens surrounded by a substance which, according to the various fixing agents used, appears homogeneous, granular or reticular. He (Cirincione) had described this substance in a work on the peri-lenticular capsule. Cirincione recognised in this a homogeneous and also a fibrillary part, and stated the reasons why it should not be considered mesodermic tissue (as thought by Lieberkühn, Bamberke, Ciaccio, etc.), but a filling-up material occupying the space between the retina and lens during the formation of the latter, to disappear later as the mesoderm entered the vitreous cavity. He (Cirincione) had not then recognised the prolongations from the lens and retina to which Van Pée and Lenhossék had drawn attention. This filling up substance, v. Lenhossék states, arises only from the lens, and Cirincione agrees with Prof. Rabl when he maintains this view inacceptable when Lenhossék asserts that no protoplasmic prolongations arise from the retina. Rabl and v. Pée have both carefully studied this substance, but he (Cirincione) can not agree with them when they state that it forms a part of the permanent vitreous. Van Pée studied embryos at a very early stage of ocular development, while it is equally necessary to study those at a later stage of development to convince oneself that this substance, abundant only in mammals, is destined to disappear. In fact v. Pée himself had observed (p. 363) that in sheep's embryos at an early age (11mm.) "it existe autour du cristallin une veritable capsule conjunctive richement vascularisée" (the peri-lenticular capsule), hence he holds that besides the ectodermic vitreous filling-up material there exists the mesodermic vitreous. Had v. Pée continued his researches to embryos of a later stage of development—to 16mm. in size,—he would have noticed the total disappearance of the filling-up material (*i.e.*, his ectodermic vitreous).

Translated by Thomson Henderson.

REVIEWS.

Beevor and Collier. **A Contribution to the Study of the Cortical Localisation of Vision: A Case of Quadrantic Hemianopia with Pathological Examination.** *Brain*, 1904. Vol. xxvii., No. 106.

The report of this case in its clinical and pathological aspects forms a valuable contribution to our knowledge of the visual area in the cerebral cortex, especially in reference to the representation of individual parts of the fields of vision. The authors have found but one previously recorded example (Hun, 1887) of quadrantic hemianopia resulting from a cortical lesion in which there has been a pathological examination, and in this case, unfortunately, no microscopical examination was made. Hence no accurate statement as to the extent of the lesion was possible.

Beevor and Collier's case was that of a man, æt. 55, admitted to hospital complaining of headache and some sensory disturbance in the left arm. His central vision was good, and he is said to have been unconscious of any defect in his field of vision. Perimetric examination showed complete loss of the upper left quadrant of each field; the blind area was sharply limited, extending close to, but not involving, the fixation point. There was no limitation of the fields in other directions. No alteration in the boundary of the blind quadrants occurred while the man was under observation, a period of sixteen months. Shortly before death there were mental failure and attacks of unconsciousness without convulsion. The *post-mortem* examination showed that an occlusive lesion of the right posterior calcarine artery had caused destruction of the cortex (1) of the right fusiform lobe for its posterior two centimetres, (2) of the right lingual lobe from the junction of the calcarine and parieto-occipital fissures to the pole of the hemisphere, (3) of the whole cortex in the depth of the calcarine fissure, (4) of the greater part of the inferior cuneal gyrus, small areas only at the anterior and posterior limits of this gyrus being free. The necrosis did not involve the optic radiation at any point. The only parts of the mesial aspect of the occipital lobe which had escaped destruction was the upper two-thirds of the cuneus and the anterior and ventral portion of the fusiform lobe.

The authors draw especial attention to the following points in their case, and submit these inferences:—

1. The larger part of the lesion was situated below the calcarine fissure. (The upper quadrant of the visual field is chiefly if not entirely represented below the calcarine fissure.)

2. The cortex lining the calcarine fissure was completely necrotic. (The primary half-vision centre cannot therefore be limited to the calcarine cortex nor the macula exclusively represented in the anterior part of this region.)

3. The portion of the half-vision centre, as limited by von Monakow, which was not involved, was the upper two-thirds of the cuneus.

4. The visual defect was blindness of both left upper quadrants. (The lower quadrants are represented to a great extent in the upper two-thirds of the cuneus.)

5. The lower quadrants of the visual fields were not affected, and the patient was not aware of any visual defect.

They maintain that these facts strongly support von Monakow's localisation of the half-vision centre, as opposed to that of Henschen. According to the former, the primary half-vision centre occupies the cortex of (1) the entire lingual lobe behind the junction of the calcarine and parieto-occipital fissures, (2) the entire cuneus and extending for half an inch or more on to the external aspect of the occiptal lobe. The calcarine fissure probably forms the line of separation of the representation of the upper and lower quadrants. Henschen, on the other hand, considers that, while the bulk of the cuneus and lingualis are doubtless concerned with half-vision as secondary centres, the primary half-vision centre is located in the cortex of the lips and depth of the posterior calcarine fissure.

Drawings of the macroscopical and microscopical changes in the occipital lobe, and charts of the fields of vision, accompany this paper and enhance the interest thereof.

J. B. L.

T. P. Anderson Stuart. **The Function of the Hyaloid Canal, and some other New Points in the Mechanism of the Accommodation of the Eye for Distance.** *The Journal of Physiology.* Vol. xxxi., No. 1.

In this paper the writer starts from the fact, first shown by Helmholtz, that during positive accommodation the suspensory ligament of the lens is slackened. The question of the form which the lens assumes during positive accommodation is not discussed. From an examination of an ox's "eye-nucleus"—*i.e.*, the vitreous, suspensory ligament and lens in its capsule, which escape in a united mass when the sclerotic and choroid are opened after the ox eye has spontaneously decomposed—it is shown that there is a very firm union of the suspensory ligament to the vitreous, for the fibres of the suspensory ligament by which it is attached to the vitreous are fairly strong. These vitreous fibres are attached to the hyaloid membrane which in the ciliary zone has the membranes of the vitreous attached to its deep surface. The membranes of the vitreous are embedded in the vitreous substance, like the roots of a plant in the ground, so that the pull of the vitreous fibres of the suspensory ligament is distributed over a large part of the vitreous body itself, especially in its antero-peripheral zone. The suspensory ligament may be regarded as being made up of three parts, and each part is named according to its immediate attachment. The vitreous portion is attached to the vitreous body, the ciliary to the orbiculus ciliaris and ciliary processes, and the capsular, made up of the ciliary and vitreous portion, to the lens capsule. The functions of the ciliary and vitreous portions of the suspensory ligament are entirely different, the former virtually is the tendon of the ciliary muscle and permits movement, while the latter plays the part of a ligament and limits movement.

When the ciliary muscle contracts it slackens the ciliary part of the suspensory ligament and thus permits the lens to bulge forwards; at the same time the vitreous portion is dragged forwards and inwards by the capsular portion of the suspensory ligament, and thus its tension is increased. The tension of the fibres of the vitreous portion of the suspensory ligament all round the lens is the only force there is to maintain the lens in its place during the slackening of the suspensory ligament, excepting the adhesion of the posterior layer of the lens capsule to the patellar vitreous membrane. Negative accommodation is caused by the elastic recoil of the choroid which becomes stretched during the contraction of the ciliary muscle, and therefore is performed quickly.

The writer's observations essentially confirm the teaching of Helmholtz, but they also indicate what is probably a most important part of the act of accommodation, viz., the function of the hyaloid canal. By suitably staining an eye-nucleus the posterior opening or openings of the canal of Stilling are made visible, and experiment shows that it is the tension of the suspensory ligament which keeps the stain out of the canal. When the ciliary muscle contracts to slacken the suspensory fibres and thus permit the lens to bulge forwards, the lens capsule pulls forward the capsular portion of the ligament and through it the vitreous portion, and so through it again the ciliary zone of the vitreous body is pulled forwards and inwards. The anterior and central part of the vitreous is therefore more or less compressed, and the lymph of the canal of Stilling is squeezed out of the anterior part of the canal into the posterior part which is widened by the same movement. Conversely, when the ciliary fibres are made tense by the recoil of the choroid and the lens is flattened in negative accommodation, the capsular portion of the suspensory ligament is pulled backwards and the vitreous part is slackened, permitting the ciliary zone of the vitreous to recede outwards and backwards, thus relatively dilating the anterior part of the canal, restoring it to its previous calibre, and compressing the posterior part. The function of the canal is thus to provide an adjustable reservoir of mobile liquid, which may be easily and rapidly displaced backwards in positive accommodation, forwards in negative accommodation. The possession of a distinct function by the hyaloid canal would account for its long persistance as a vestige.

C. H. U.

De Lapersonne and Poulard. **Early Posterior Capsulotomy.**

Archives d'Ophtalmologie, October, 1904.

The treatment of the capsule subsequent to the operation of extraction, or at the same time, continues to exercise the minds of surgeons, and is likely to continue to do so. Many shrink from meddling at all, provided a reasonably good result is attained by means of extraction, and unless there is a membrane sufficiently dense to negative the attainment of useful vision, decline to interfere. Others again fearlessly "needle" in any case in which even a slight further gain may be looked for. The argument, or at least one important argument, for early interference if the further operation is to be performed at all, rests upon the fact that as time goes on the membrane appears to become less and less retractile, and consequently a late "needling" may merely make a narrow slit in the membrane which closes together again, whereas the same manœuvre, carried out at an earlier period, would have given a permanent wide "pupil." Knapp, who is a zealous advocate of an early needling, has certainly not been able to convert all to his way of thinking. While most probably the anterior capsule is chiefly to blame for the loss of transparency and the necessity for a needle operation, the posterior can certainly not be exonerated. The two authors whose paper is before us are quite clear as to this, and the reviewer is disposed to agree with them on the ground of his experience of needling before and since the adoption of forceps at the time of extraction with which he removes the central portion of the anterior capsule. Since adopting this procedure as a routine he finds that he does not so frequently have to resort to needling subsequently, but the necessity for the subsequent operation does arise in a certain number of cases; this seems to show, if proofs were needed, that to some extent the posterior capsule is to blame.

In 1897 Da Gama Pinto described a method of posterior discission of the capsule which he practised; it seems a somewhat delicate procedure. A Graefe's knife is introduced into the globe about 6 to 8mm. from the corneo-scleral junction; the edge of the knife is turned backwards and the point directed to the centre of the globe. Immediately the point is introduced it is directed towards the pupillary border of the iris and is caused to transfiex the membrane from behind forwards; it is then passed across the pupil along the anterior face of the capsule as far as the opposite pupillary margin; there the counter-puncture is made, and by a delicate sawing movement the membrane is divided. This procedure must be one of some difficulty we should judge. Two other methods of attack find favour with very few surgeons save those who have been their early advocates; the first of these is the practice of Hassner and others, who divide the posterior capsule immediately on the completion of the operation of extraction, a procedure the objection to which are obvious, and, we should think, overwhelming. The second method is that recommended by Smith (Jullalpore), who with considerable temerity extracts every lens in its capsule. This cuts the Gordian knot, but the risks are too great, in the opinion of the majority of surgeons, to justify the procedure.

W. G. S.

H. Frenkel (Toulouse). **On the Connection between Myopia and Corneal Opacities.** *Annales d'Oculistique*, September, 1904.

For the last fifty years at least it has been held as an accepted fact among ophthalmic surgeons who have had a wide field of observation at their command that central corneal opacities are frequently associated with a progressive myopia accompanied by lesions of the fundus and entailing a diminution of visual acuteness. M. Frenkel, in his article with the above heading, gives a résumé of the opinions of those ophthalmologists who hold such views and has compiled a full bibliography on the subject, which is added to his article. He has examined 1,350 cases and tabulates his results along with those of Cohn, Nicati, Petersen, Gelpke, Chauvel, Manguis, Fortin, and Widmark.

As regards the pathogenesis of myopia in cases of corneal opacity, Graefe has clearly said that the myopia is due to the fact that such patients try to supplement the want of clearness of their retinal images by increasing the size of them, and so the object is brought nearer to the eye. Petersen, in 66 cases of unilateral corneal opacity, found myopia in both eyes in 21 cases, that is 32 per cent. Fortin found in 28 cases of unilateral corneal opacity myopia of both eyes in 17 cases, that is 60 per cent. Consequently this myopia would be more naturally thought to be due to convergence rather than to accommodation. M. Frenkel, however, has found in his cases of unilateral corneal opacity no single case in which the myopia was equal in the two eyes and imputable in both eyes to the opacities. On the contrary, what appeared most frequently was a myopia of the eye affected or of the eye not affected, but unilateral. If this is constant then the accommodation is the cause of the myopia; if the affected eye can see near objects well enough it becomes myopic; if it is not used for such work it is the unaffected eye that becomes myopic. Moreover regular or irregular astigmatism, by lessening the clearness of images, may induce myopia. M. Frenkel has tabulated some results of his examination for such defects. Finally, according to the theories of Panas and de Lapersonne, " inflammatory lesions of the cornea and anterior segment of the eye react without doubt by an ill-defined, but none the less real, process on the choroid and retina of the posterior pole . . . which then becomes the chief cause of a pathological myopia, often progressive." M. Fortin applies these views of de Lapersonne on keratoconus and buphthalmos to the pathogenesis of myopia with corneal opacities opacities, " we have, in fact, several times determined that the curvatures of the cornea was exaggerated, as in cases of slight keratoconus." M. Frenkel, however, calls attention to the fact that ocular hypertension leads to flattening of the cornea, and thinks that new researches must be made before the cause of this myopia can be known definitely.

There can be no doubt from the literature quoted by M. Frenkel that corneal opacities situated in the pupillary area produce in a third of the cases (perhaps in more) a myopia whose tendency is to become progressive. Bilateral opacities produce most frequently a bilateral myopia. Unilateral opacities give rise most often to unilateral myopia, occurring in the eye which is most used for near vision, be it the affected or the non-affected eye; and the age of the opacity appears to have some influence on the degree of the myopia, which is an axial myopia and not on of curvature. The corneal opacities, leaving irregular astigmatism out of the question, occasion on an average a measurable astigmatism of from 1·5 to 2 D.

Finally, M. Frenkel points out that great stress ought to be laid on the prophylaxis of phlyctenular keratitis and other affections producing corneal opacities; patients actually affected with corneal opacities should have their refractive errors carefully corrected and everything should be done to prevent the progress of their myopia.

Frank C. Crawley.

Engelmann. **Tonometric Investigations in Healthy and Diseased Eyes.** *Mitteilungen aus der Augenklinik u. Jurjew*, Berlin, 1905.

The tonometer employed was Maklakow's. A certain constant weight (10 grains) is allowed to press on the cocainised cornea, the contact being effected by the end plate of a cylinder damp with a solution of bismarck brown. The extent to which the cornea is flattened is indicated by the size of the circle on the cylinder which is bleached, and by transference of this circle to paper " tonograms " are obtained. The patient must, of course, be in the horizontal position, and no speculum must be used, for this is always found to increase the intraocular pressure. The most serious fallacy of the instrument is that the size of the circle which takes the colours depends to some extent on the moisture present on the corneal surface.

With a knowledge of this and other possible sources of error, however, several series of observations were taken which, though not proving much that is new, are of some practical interest. The first had to do with the relations between intraocular and general blood pressure. Experimenting on the rabbit, it was found that after ligature of the common carotid the intraocular pressure falls in both eyes but the fall is considerably greater, and lasts considerably longer, in the eyes on the same side as the artery ligatured. After ligature of the external jugular vein the pressure also rises in the eye of the same side, but the rise is only temporary. Observations on the human subject showed that during Valsalva's experiment, and also during muscular work, the rise and fall of the intraocular pressure corresponds with that of the general blood pressure but is less marked. A second series of experiments dealt with the effect of general narcosis on the intraocular pressure. These tended to show that the latter is diminished by chloroform and increased by ether. Here also the effect is probably dependent on the general blood pressure. Next we come to experiments dealing with the sympathetic nerve. Stimulation of the sympathetic in rabbits causes a fall in intraocular pressure on the same side, which, however, only lasts while the stimulation is continued.

The resection of the sympathetic, or the extirpation of the superior ganglion, causes, in rabbits, a fall of intraocular pressure on the same side. The fall is gradual, taking from 8 to 40 hours to attain a minimum pressure, and is followed by a still more gradual rise to the normal, or even above the normal. Observations were taken on the human subject in four cases, two in which the superior cervical ganglion was excised for Graves's disease, two in which the operation was undertaken for glaucoma. Not one of these cases affords any evidence that the operation causes anything more than a mere passing diminution in the intraocular pressure.

From another series of experiments on eleven healthy individuals the conclusion was that physiological variations in the width of the pupil have not the slightest effect on the intraocular pressure. Contraction of the external eye muscles was found to have a more definite effect, and the conclusions arrived at were as follows:—The contraction of the orbicularis oculi in men causes a rise of intraocular pressure. A rise of 14mm. of mercury may easily happen. In rabbits, tenotomy of all the straight muscles causes a fall of about 4mm. So long as the eyes are parallel, the intraocular pressure does not vary with their direction. Strong convergence slightly increases the intraocular pressure, but accommodation dissociated from convergence has no such effect.

The paper concludes with a record of observations taken in various diseases, none of which, however, materially add to our knowledge. The volume of *Mitteilungen* contains a number of other papers as well.

A. H. T.

CLINICAL NOTES.

The Bacteriology of Trachoma.—Probably the nearest approximation yet reached to the discovery of the *causa causans* of trachoma was made by Müller, who, in 1900, found a bacillus resembling that of influenza in about one-third of the cases of a series. This organism he did not find in non-trachomatous conjunctivitis, and it appeared to be present most frequently and most copiously in the recent cases. He was unable by any culture tests to discover any difference in reaction between this organism and that of influenza, but since no symptoms of influenza were present it seems improbable that they are actually identical. A. Knapp in a series of cases of trachoma employed expression, and carefully examined bacteriologically the contents of the follicles thus obtained. In one series of investigations the expressed material was directly streaked on the agar, etc., in a second it was first transferred to broth tubes and placed in the incubator before streak and other cultures were attempted, and in a third series the follicle contents were carefully triturated and the emulsion streaked upon the media. Many different methods, agents, etc., were employed, and the only noteworthy result was that in four cases an influenza-like bacillus was found. This work was done some time ago, but Knapp has repeated it lately, and found an influenza-like organism in four other cases, examining the conjunctival discharge. Some authorities speak of an influenza group of bacilli, including therein the influenza bacillus, the pseudo-influenza bacillus, and Müller's bacillus. It has been held by some that the Koch-Weeks bacillus is identical with the influenza bacillus, but this view does not commend itself to the majority of those who have written on the subject. The true influenza bacillus has been observed to cause conjunctivitis, indeed in one case of Knapp's it caused a pseudo-membranous conjunctivitis in an infant, with partial destruction of the cornea, there being no reason whatever to suspect trachoma, and no manifestations of "general" influenza. In such a case does the absence of such general symptoms indicate that the organism must have been only the pseudo-influenza variety? It is not easy to give a definite answer, but one must remember that if we have to deal with pneumococcal and diphtheritic affections of the eye without general symptoms, why not influenzal? Knapp comes to the conclusion that in all likelihood the presence of this influenza-like organism, with which he met eight times in a hundred and twenty cases, and of Müller's organism, in his series, was merely accidental, and that these bacilli are not causally related to trachoma.—*American Archives of Ophthalmology*, September, 1904.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

The President, Mr. J. Tweedy, in the Chair.

Meeting held November 10th, 1904.

Cases and Card Specimens.

Peculiar condition of Corneal Opacity.—Messrs. Doyne and Stephenson.

The patient, a boy 12 years, had suffered from periodical attacks of inflammation of both eyes. Examination of the corneæ, with oblique illumination, showed the existence of well-defined transverse calcareous films, having no vessels but enclosing numerous small round areas which at first appeared pigmented, and on closer examination proved to be either holes in the opacity, or areas of cornea which had not undergone the calcareous change; through these the red fundus reflex could be clearly seen.

Two children in the same family with Congenital Opacities of both Corneæ.—Mr. E. Teacher Collins.

In the elder child, a girl aged seven years, both eyes were smaller than normal and showed irregular nystagmic movements. Both corneæ possessed about the same curvature as the sclerotic, but the right eye appeared to be globular in shape while the left tapered to a point like the smaller end of a hen's egg. Each cornea also presented a diffuse white opacity in its substance, varying in density in different places. Both corneæ appeared to merge into the sclerotic, there being no defined corneo-sclerotic margin, and the blood-vessels of the conjunctiva extended into each cornea. No details of the iris could be made out in either eye.

The younger child, a boy aged 3½ months, possessed small eyes, both of which showed a diffuse white opacity in the cornea similar to that in the previous case, and with the same extension of the conjunctival blood-vessels into them. The sclero-corneal margin was very ill-defined, not only on account of the opacity but also from the absence of any differentiation in the curvature of the cornea. Both eyes showed nystagmus, but they followed a bright light when it was directed towards them. These children were respectively the first and third children of the family, and both were said to have been born blind. In neither case had there been any discharge from the eyes, nor had the eyes shown at any time undue redness. The mother had had a white vaginal discharge previous to, and since marriage, had had three children and no miscarriages. The corneal opacities dating from birth might be said to be due to (*a*) an injury during birth; (*b*) intra-uterine inflammation; (*c*) malformation. As regards the first it was highly improbable that two children of the same family would have opacities of both corneæ the result of traumatism during the birth. In the two above recorded cases there was not sufficient evidence to determine to which of the other causes the opacities were due. The mere presence of blood-vessels in the cornea might be regarded at first as being in favour of a past keratitis, but the writer stated that he had seen microphthalmic eyes, with other congenital malformations, in which blood-vessels were present in the anterior layers of the cornea, with absence of the anterior limiting membrane and an irregularity of the anterior layers of the substantia propria, without there being any evidence, microscopically, of inflammatory exudation.

An Unusual Form of Lamellar Cataract.—Mr. S. Mayou.

The inner quadrant of the right lens in this patient, a man aged 32, presented a moderately dense striated opacity which extended inwards to the centre of the lens and outwards to near the cortex but was bounded by a clear layer at the periphery of the lens. It formed a complete sector of the lens and evidently occupied several lamellæ. A faint opacity could be seen extending all round the lens within the margin of the dilated pupil, but having clear lens between it and the periphery. There was no history of fits, and only a very indefinite history of a "black eye" when nine years of age, but whether it was the right eye or not could not be definitely stated.

Peculiar Appearance of a Retinal Vein.—Mr. George Coats.

The patient, a delicate-looking girl aged 13, showed in the right fundus three distinct loops, all of which projected slightly into the vitreous and were all in the course of the superior temporal vein. This vein, which like all the other veins was somewhat tortuous, enlarged, and of varying calibre, divided at some three disc-diameters from the disc into two, an upper and a lower one, the upper one seemed to "short circuit" the lower branch, which contained the three loops. The first loop from the disc outward appeared to run directly forwards into the vitreous, the second was a complete circle which projected much in the same manner as the first, and had two sharp kinks in it. The vein then pursued a normal course as far as it could be traced. The vein beyond the looped portion did not appear to be obstructed. No hæmorrhages were seen nor were any similar appearances found in any other vessel. The girl had suffered from rheumatic fever 17 months ago and had been rather breathless ever since, though nothing abnormal was found on examination of her heart, except that its beat was rather rapid. The vision in each eye with correcting glasses for astigmatism was $^6/_{18}$. The probable origin of this peculiarity was discussed. In favour of its being congenital the general tortuosity of the veins (and not of the arteries), the absence of any present hæmorrhages or exudation in the retina, the projection of the loops into the vitreous, and the age of the patient were all given. On the other hand, in favour of this being of an acquired origin, were the history of acute rheumatism and the presence of the collateral loop which gave a close resemblance to a vascular net of which only two of the branches had survived, these latter most frequently following upon retinal hæmorrhages.

A Case of Amaurotic Family Idiocy.—Mr. J. Herbert Parsons and Dr. F. J. Poynton.

This was a typical case of central choroiditis as first described by Mr. Waren Tay, in an infant apparently blind and suffering from weakness of neck and spine. Both discs were pale, and in the macular region the dark spot almost like the cherry red spot was seen surrounded by a large white halo. This was the second case which had occurred in the family.

PAPERS.

Intra-ocular Tumour covering the Optic Disc.—Mr. Simeon Snell.

The patient, a farmer aged 37, had complained of loss of sight in his left eye of a month's duration. The vision when tested had been found to be only finger counting at a very short distance. Ophthalmoscopic examination revealed the presence of a peculiar cyst-like swelling 2½ disc-diameters in size, irregularly circular in form, lying over and completely obscuring the optic disc. The lower central artery and vein were seen escaping from under the rounded overhanging inferior portion of the mass to its nasal side. The mass at first presented a cyst-like translucency, but closer examination proved it to be solid with numerous small blood-vessels coursing over its surface, and in places hæmorrhages and the remains of partially absorbed hæmorrhages. The most prominent part was seen best with a +11D. lens. Above this a crescentic area, seen best with a +6D. lens, appeared joined to it and occupied by whitish-yellow, circular dots. The entire fundus presented a fluffy, flannel-red, homogeneous appearance, the normal stippling being absent. Enucleation of the globe had been performed, the optic nerve being divided as far back as possible. Examination of the globe after removal showed the presence of a small black nodule on the posterior segment of the sclerotic, and to the outer side of the optic nerve. The eyeball was microscopically examined by Mr. Treacher Collins. The growth, which extended through the sclerotic posteriorly and between the optic nerve and its sheath, was a small spindle-celled, melanotic sarcoma which arose in the choroid about the optic disc and extended with a knob-like protuberance 5mm. inwards towards the centre of the globe. The globe was deeply pigmented at its periphery, and greyish in its interior. The retina was adherent to the apex of the mass and had a large triangular hæmorrhage in it extending down and out. In the optic nerve the growth had pressed back the lamina cribosa, and at the upper border a considerable mass extended through it to the space between the dural sheath and the nerve itself.

Some anomalous Sarcomata of the Choroid,—By J. Herbert Parsons.

Six cases were demonstrated by means of lantern slides. Case 1 was an ordinary melanotic sarcoma of the choroid in the third stage, the extra-ocular extension being unpigmented. The patient died a year after removal of the eye, and was found to have secondary, bile-stained, spindle-celled sarcoma of the liver, and squamous-celled carcinoma of the ribs, lung, and mediastinal glands. Cases 2 and 3 were almost identical in appearance and general character. The globes contained very necrotic, round, angio-sarcoma of the choroid. There was extensive necrosis of most of the other structures of the eye. Case 4 had an extraordinary family and personal history: the mother and younger sister had each had an eye removed at Moorfields for sarcoma of the choroid, and the patient had had her breast removed for a tumour. There were two small melanotic sarcomata of the ciliary body and anterior part of the choroid, and a large, bilobed necrotic angio-sarcomatous mass springing from the choroid posteriorly. The other structures of the eye were necrotic and there were many hæmorrhages. Cases 5 and 6 were necrotic angio-sarcomata, springing from the choroid at the posterior pole of the eye. The other structures of the eye were also necrotic. The points specially insisted upon were as follows:—The similarity of the growths macroscopically to organised blood clots and their apparent origin in the retina—an appearance which was demonstrated to be erroneous; the varying occurrence of hæmorrhage, the importance of not overlooking sarcoma of the choroid in cases of severe intra-ocular hæmorrhage, and the relation of the hæmorrhage to the necrosis, whether as cause or result, both probably occurring; the necrosis, its dissimilarity from the patches of necrosis in ordinary sarcomata, its universality, not only throughout the tumours but also in other parts of the eye. The deductions made were that the necrosis was not due to a preliminary irido-cyclitis, was not due to thrombosis and only partially to hæmorrhage; it was probably due to endogenous microbic infection, essentially by means of toxins universally distributed throughout the eye by the intra-ocular fluids. The theory was comparable with the most probable theory of sympathetic ophthalmia—namely, generalised, endogenous infection by invisible organisms. It explained the marked inflammatory reaction sometimes seen outside the eye. The malignancy of these growths is probably low, on account of their genesis, their necrotic condition, and the thrombosis of the vessels. If, therefore, the eyes had not been excised, they would have shrunk and become examples of shrunken globes containing choroidal sarcomata. That the eyes would inevitably have shrunk was shown by the albuminous constitution of the intra-ocular fluids, which would have led to diminished filtration and stasis; moreover, the universal necrosis must lead to shrinkage. The growths were also identical in type with those previously found in shrunken globes. Such tumours probably were frequently overlooked, owing to their great resemblance to intra-ocular blood cloths. They were of great practical importance from the point of view of prognosis, and also in point of theory, since they marked a stage which had previously escaped observation in the life-history of a group of sarcomata.

Reginald C. Bickerton.

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STEREOSCOPIC TREATMENT OF STRABISMUS.

To the Editor of "The Ophthalmic Review."

Dear Sir,—

I should like to call the attention of Dr. Fergus and others of your readers who are interested in the stereoscopic treatment of strabismus, to a cheap and simple stereoscope which I have been prescribing in suitable cases for now nearly two years. It is Wheatson's stereoscope, which has been arranged for the use of strabismus cases by Prof. Hallwachs, of Dresden. The mirrors are set on hinges, which permit the amount of convergence (divergence) to be varied from 50 degrees convergence to about the same amount of divergence. As supplied the instrument has lenses to render the rays from the pictures parallel, but it would be easy to substitute a clip to take any glass from the trial case. The degrees of convergence are read off a graduated arc. Prof. Hallwachs made the stereoscope for the treatment of his own daughter's case, and described it in the *Zeitschrift für Augenheilkunde*, Jan., 1903. Like so many of our tools, it is "made in Germany," but one of our local opticians supplies it to my patients for the moderate sum of fifteen shillings.

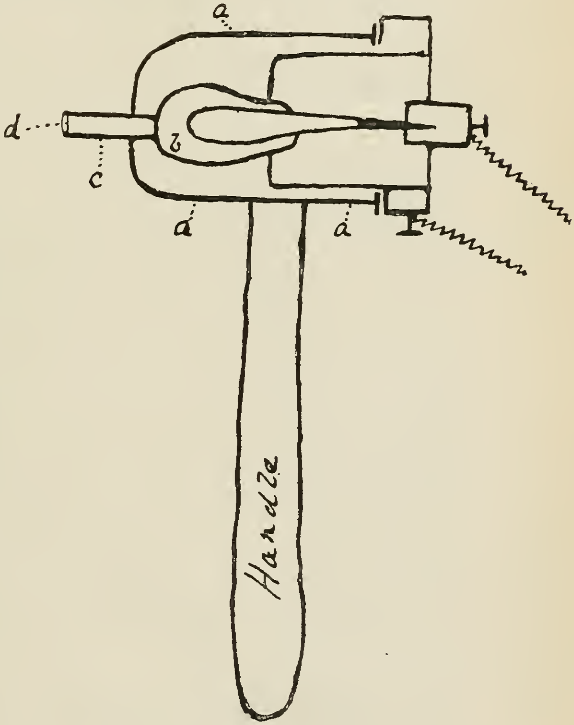
I am, yours faithfully,

John B. Story.

ON TRANSILLUMINATION OF THE SCLEROTIC.

By H. R. Swanzy, Dublin.

I am under the impression that transillumination of the sclerotic for the diagnosis of intra-ocular tumours is not employed as extensively as this valuable method deserves to be. On the occasion of a visit to Prof. Leber, in July, 1902, he showed me an instrument he had recently had made for this purpose, and at the next following meeting of the Ophthalmologische Gesellschaft,[1] in August of the same year, he demonstrated the instrument. It is of about the size represented in the accompanying rough sketch, and it consists of a small electric lamp (b) enclosed in a metal capsule (a). The anterior end of the lamp is in contact with a short glass rod (c), which is covered with a hard rubber jacket. The lamp requires a current of not more than 8 to ten volts. When the current has been switched on, the light of the lamp is transmitted along the glass rod, and the exposed end (d) of the latter is then placed on the sclerotic of the cocainised eye.



If the eye be normal, or even if a ripe cataract be present, the pupil lights with the familiar red glow from the chorioid. But should an intra-ocular new growth be present, internal to the spot on which the glass rod is applied, the pupil does not light up—it remains dark. The glass rod gradually becomes warmer, until it is too hot to be borne by the eye, but there is usually ample time before that to complete a clinical examination.

It is in those not infrequent cases in which there is a strong suspicion of the presence of an intra-ocular tumour, but where, owing to a detachment of the retina or opacity of the media, a positive diagnosis with the ophthalmoscope cannot be arrived at, that sclerotic transillumination is of the greatest use. We all meet with cases in which, while we feel almost certain, from the history, signs, and symptoms, that excision should be performed, yet we hesitate to recommend the measure to our patient, whose eye may still have good vision, and who cannot be told with absolute certainty that there is a cancer within it. Moreover, the patient in such circumstances is apt to decline operation. In a large proportion of these cases transillumination will remove the doubts and difficulties both of the surgeon and of the patient. The obvious and only limitation of the method is where a tumour is confined to the posterior pole or its neighbourhood, or, indeed, to any region much behind the equator of the globe—a region in which the glass rod cannot be brought in contact with the sclerotic.

The mode of procedure is simple. The end of the illuminated glass rod is placed on the sclerotic at the spot corresponding to the part of the fundus where it is thought the new growth is most probably situated. Should the pupil remain dark the examination is ended, and the diagnosis of an intraocular growth at that spot is made. But if the pupillary red glow be obtained on the first application of the glass rod, the latter is slipped over the sclerotic in the whole region of the detached retina, or in some cases over the whole exposed sclerotic, in search of a spot on application of the illuminated glass rod to which the pupil does not glow. If no such spot can be found it is concluded that no tumour is present in the region which can be reached with the glass rod.

The maker of Prof. Leber's transilluminator is R. Jung, of Heidelberg. The end of the glass rod which is applied to the sclerotic measures only 1c.m., and consequently even the smallest tumours can be detected with it. I have recently seen two sclerotic transilluminators, each of them by a different maker, but in each the glass rod was so large that with it small tumours might well escape detection, and large tumours would be less easily detected than with the Heidelberg instrument. The following cases will serve to illustrate the value of this method:—

Case i. Miss B., aged 50, came to me on the 14th April, 1903, complaining of a "blackness" or "darkness" in the upper part of the field of the right eye, which had been present since the previous August. Like its fellow, the affected eye was emmetropic, central vision was $^6/_9$ Sn., and the smallest type could be read. Tn. The outward appearance of the eye was normal—there were no enlarged vessels on the sclerotic; but there was a well-marked complete defect in the upper inner quadrant of the field. The ophthalmoscope showed a circumscribed and prominent retinal detachment at about the equator in the lower and outer part of the fundus. The fundus was otherwise quite normal, as were also the media. There could be little doubt as to the presence of a chorioidal tumour. Yet here was a lady with almost normal sight, who came to me expecting to be ordered an eye-wash, and to whom I would have to recommend excision of her eye-ball, without being able to say with absolute certainty that she had a cancer in her eye. The transilluminator was used, and after one or two spots in the detached retina region had been tested, and a red glow from the pupil obtained, a spot was discovered upon application of the glass rod to which no red glow appeared. It was also easy, by slipping the rod over this region, to say that the tumour was a small one. The nature of the disease in her eye having been explained to the patient, she at once consented to removal of the globe. A sarcoma of the chorioid was found. It measured from 4 to 5c.m. at its base, and protruded into the eye about 3c.m. It was situated in the lower and outer quadrant of the fundus, one-third of the tumour being in front of the equator and two-thirds behind the equator. The accompanying Fig. 1 gives some idea of the growth: the entire retina and vitreous have been removed.

Case ii. Michael Ford, aged 57, was admitted to the Royal Victoria Eye and Ear Hospital on the 21st August, 1903. He said that a year previously the sight of his right eye began to fail, and gradually became worse, but he had not at any time noticed a definite defect at some one part of the field. He had had some pain, which was for a time very severe. On examination of the state of the eye and its vision, it was found that there was no power of perception of light, and that T was + 2. The cornea presented a steamy appearance, and at its centre there was a small, crescent-shaped, clear-cut ulcer, to which large pannus-like vessels ran from the lower corneal margin. The pupil was semi-dilated. On the sclerotic between the inner margin of the cornea and inner canthus there was a very distended vein. The whole front of the eye-ball was anæsthetic. The state of the cornea rendered an ophthalmoscopic examination impossible. The left eye was quite normal. Here the signs and symptoms strongly pointed to the diagnosis of an intra-ocular tumour. This was definitely confirmed by transillumination, which gave the tumour reaction, if I may so express it, when the instrument was applied to the inner

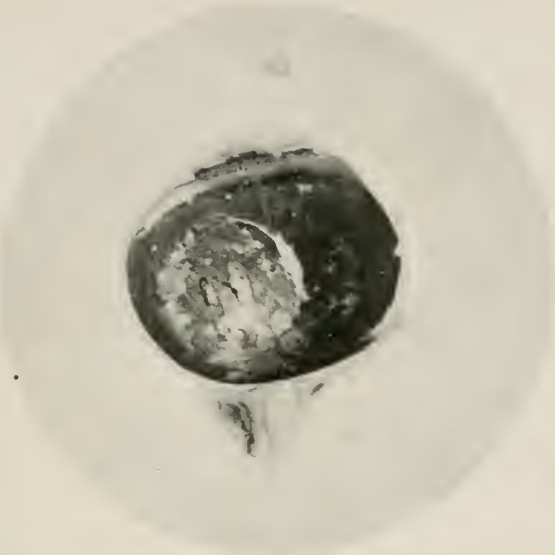


Fig. 1.

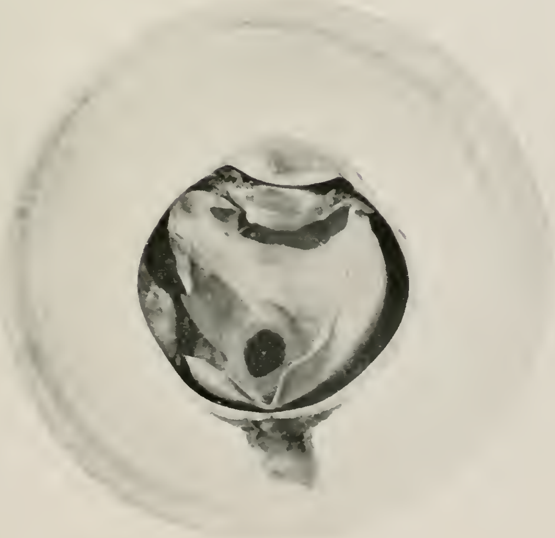


Fig. 2.

aspect of the globe, both in front of and behind the equator. The eye was enucleated, and when opened after hardening it was found that two-fifths of the inner portion of the chorioid were occupied by a sarcoma, which did not project much over the surface of the membrane, except at one place where there was a prominent nodule, the top of which was cut off in dividing the globe. The retina was not very extensively detached. Fig. 2 represents the interior of the affected half of the eye-ball.

CASE III. Annie Walker, aged 50, came to the Royal Victoria Eye and Ear Hospital as an out-patient on the 17th October, 1904, complaining of the sight of her right eye. With it she could only count fingers at 1m. There was a marked detachment of the retina below and to the outside, and some opacities in the vitreous humour. The right eye was emmetropic, and its vision was normal. A chorioidal tumour as the cause of the detachment came naturally to mind, but transillumination did not show the presence of a tumour, and four days later the detachment had completely disappeared, to reappear ten days later in the upper part of the fundus. It is unnecessary to narrate the subsequent course of this somewhat unusual case, but the disappearance and reappearance of the detachment were sufficient to confirm the diagnosis made by transillumination, and to show that the detachment was not due to a tumour.

Transillumination of the sclerotic for diagnostic purposes was first used by O. Lange.[2] He employed the ordinary focal illumination at the suspected place on the sclerotic in two cases. Von Reuss[3] introduced an instrument for transillumination with electric light, much on the same principle as that of Leber.

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AMBLYOPIA DUE TO METHYL ALCOHOL.

By J. W. Stirling, M.D., Montreal.

The comparative rarity of this condition and its gravity render the publication of case reports of some value.

The minimum quantity of wood spirit necessary to produce the ocular symptoms is as yet uncertain, but the onset is very rapid and is associated with much general disturbance. There is marked loss of vision, going on quickly to total blindness, which may, after a varying length of time, improve to a greater or less extent, but which always ends in a certain degree of atrophy of the optic nerve with corresponding limitation of the visual field. Optic neuritis has been noted at the onset.

The pathological change must affect the whole optic nerve and not be limited to any particular nerve bundles. The visual field suffers a peripheric contraction of irregular shape and degree, but is never hemianopic, and it is rare even in the mild cases that a central scotoma has been observed. My case report is as follows.

H.E., rather thin nervous man of forty-one years of age, was brought to me by Dr. Winter of Algonquin, Ontario, on account of poor vision. The patient stated that he had had poor sight for over a year. The onset of his trouble was very sudden, and dated from a severe drinking bout about thirteen months ago. At that time he drank six ounces of wood spirit and two ounces of brandy in one hour. He felt stupid but managed to eat his supper, went to bed and slept well. The next morning felt unwell but ate his breakfast and later his dinner. About 3 p.m. (22 hours after drinking the alcohol) he vomited severely, and then went to bed two hours later, sleeping twenty-four hours continuously. Upon awaking he found that his vision had entirely gone. The patient remained totally blind for thirty-six hours, but at the expiration of that time he began to notice shadows of objects with the left eye; this vision slowly improved for six months, but has remained at a standstill ever since. He began to appreciate shadows with the right eye about a month after the left eye first noticed them. The vision of the right eye likewise improved slowly for a few months, but this improvement has also ceased for the past six months.

His present condition is as follows: Vision = R.E. $^1/_{20}$; L.E. $^1/_{10}$; no lens further improves vision. The pupils barely oscillate to light, and are 3 to 4 millimetres in diameter. There is total colour blindness.

The ophthalmoscope shows both optic discs to be chalk white, the edges sharply defined, and the retinal vessels only somewhat diminished in diameter. The visual fields are greatly contracted, especially the right one, only a small portion upwards and outwards being retained.

The right field extends upwards 35°, up and out 40°, but ceases 10° short of the horizontal meridian; in no direction does it reach below the fixation point; finally, it extends 15° to the upper inner side of the vertical meridian. The left field is much larger than the right, extending to between 40 and 50° up and out, down and out, and horizontally inwards with deep re-entering angles, as is the rule in cases of optic atrophy.

It is now over a year since I last saw him, but from the latest accounts his condition remains unchanged.

Ward Holden considers the methyl alcohol amblyopia as similar in nature to that caused by quinine poisoning or that following severe hæmorrhages. In his experiments with methyl alcohol on animals (in 1899) he found marked changes in the ganglion cells of the retina and in the optic nerve trunk.

Birch-Hirschfeld has noted similar changes (*v. Graefe's Archiv. f. Ophth.*, lii., Heft 2).

Rymowitsch, in similar experiments on rabbits, found fatty degeneration, etc., of the ganglion cells of the retina, with varicose hypertrophy of the nerve fibres, and œdema of the granular layers, but without changes in the optic nerve itself.

Birch-Hirschfeld considers the changes in the ganglion cells to be the primary lesion, and the optic nerve degeneration to be secondary thereto.

REVIEWS.

HARRIS (WILFRED). **Binocular and Stereoscopic Vision in Man and other Vertebrates, with its Relation to the Decussation of the Optic Nerves, the Ocular Movements, and the Pupil Light Reflex.** *Brain*, Vol. xxvii., No. 105.

THIS long and interesting paper is in the main a record of investigations conducted by the writer and extending over a period of several years. The experimental part includes a series of lesions of the optic tract on one side in cats; division of the posterior commissure in cats; division of one optic nerve in pigeons, owls, rabbits and cats, after which the optic chiasm and optic lobes were examined by the Marchi method; and in the toad and chameleon by the Weigert-Pal method. In addition the pupil reaction to light, the position of the eyes in the head and the ocular movements were studied in a considerable number of animals.

The subject of the paper is discussed under the following headings:—(1) Binocular vision, and its relation to the decussation of the optic nerves, and to the feeding habits of the animal; (2) stereoscopic vision; (3) macular vision; (4) ocular movements, conjugate and independent, and their relation to stereoscopic and periscopic vision respectively; (5) the path of the pupil reflex to light, including the results of experimental section of one optic nerve, one optic tract, and of the posterior commissure in cats; (6) Argyll-Robertson pupil phenomenon.

The author includes in his paper a summary of the conclusions to which he has come. This summary we reproduce *verbatim*, but those interested in the subject will do well to read the original article.

Summary of Conclusions.

1. The decussation of the optic nerves at the chiasma is complete in all fishes, amphibia, reptiles and birds, whether possessed of binocular vision or not.

2. Binocular vision is originally associated with carnivorous habits and is found to a moderate degree amongst carnivorous fishes in a few of the sharks and rays, in some amphibia, as the toad, which lives on flies and insects, and in many carnivorous birds, especially the larger gulls, some penguins, hawks, owls and vultures. Amongst mammals binocular vision is especially developed in the carnivora and in the primates. In the latter group of monkeys and man perfect binocular vision is probably associated with the development of the hand as a prehensile organ.

3. Though many of these animals have fair binocular vision, yet in all vertebrates below mammals there is total decussation of the optic nerves at the chiasma, and their vision is therefore not stereoscopic in the same sense as in the higher mammals, in which visual impressions from the two eyes are received on the same side of the brain, owing to the semi-decussation of the optic nerves at the chiasma; and their macular vision is also less developed than in the higher mammales, as in the felidæ and primates.

4. In animals with laterally-placed eyes and periscopic vision the movements of the eyes are independent of each other, as typically seen in the chameleon, while conjugate movements of the eyes for lateral and vertical movements are associated with the acquirement of stereoscopic vision. Convergence of the eyes in the act of feeding is seen in many animals with total decussation of the optic nerves and otherwise independent movements of the eyes, as in the chameleon and the hornbill.

5. The reflex contraction of the pupil to light is limited to the eye stimulated, and is not consensual, in amphibia and in birds, whether possessed of binocular vision or not. In the

rabbit, with scarcely any binocular vision, only the one pupil reacts, and the decussation is complete. In cats and in the higher mammals with good binocular vision and semi-decussation of the optic nerves at the chiasma there is consensual pupil reaction. Consensual pupil contraction to light is therefore dependent, not on binocular vision alone, but on semi-decussation of the nerves at the chiasma.

6. In the rabbit and the cat both the crossed and the uncrossed fibres are spread equally through all parts of the two tracts, and are not collected into any distinct bundle.

7. Experimental division of the optic tract on one side in cats produced distinct homonymous hemianopia, with the hemiopic pupil reaction, and with considerable diminution of the pupil reaction to direct light in the opposite eye, though its consensual reaction was brisk on exposure of the other eye to light.

8. Injuries, either lateral or dorsal, of the anterior corpus quadrigeminum in cats, if deep enough to wound the tegmental roof surrounding the central gray matter, have produced in four cases descending degeneration in Meynert's fountain decussation, most of the fibres decussating at the level of the third nerves to form a longitudinal tract immediately ventral to the opposite posterior longitudinal bundle, but a few uncrossed fibres passing into the posterior longitudinal bundle of the same side. These are the antero-lateral columnar fibres already traced by Boyce into the lower cervical cord. In no case have I produced any degeneration in Forel's lower decussation.

9. In animals with divergent optic axes and periscopic vision and total decussation of the optic nerves there must exist a posterior total decussation of the pupil reflex fibres connecting the anterior corpora quadrigemina with the third nuclei; while in mammals with good binocular vision and semi-decussation of the optic nerves at the chiasma there must be a semi-decussation of the posterior pupil reflex fibres. Consensual reflex contraction of the pupils to light is effected by means of this posterior semi-decussation between the corpora quadrigemina and the third nuclei, and not by means of any commissural fibres between the sphincter pupillæ centres in the third nuclei.

10. The lesion in typical Argyll-Robertson pupil is probably a sclerosis of these fibres, some of the fibres of Meynert's

decussation, and simple reflex iridoplegia is not due to a nuclear lesion, though a nuclear lesion may be superadded in the dilated type of Argyll-Robertson pupil, in which the reaction to convergence and accommodation is also lost.

J. B. L.

CLEMENS HARMS (Breslau). **The Pathological Anatomy of the Senile Affection of the Macula.** *Klinische Monatsblätter für Augenheilkunde*, May, 1904.

HAAB, in 1885, drew attention to a disease of the central part of the retina occurring in old persons, which he called "the senile affection of the macula." At the Heidelberg Congress of 1888 he described it as follows:—"Senile disease of the macula comes next in frequency to the traumatic; indeed, it is possible that it is even more common, and that it is the anatomical basis of the so-called "amblyopia without changes" of old people, for as a rule it is visible only after the dilatation of the pupil, and then not easily. It may compromise the result of the most perfectly performed cataract operation; we should therefore bear in mind that it is usually bilateral when we are presented with a case in which there is complete cataract in one eye and signs of the macular affection are to be discovered in the other. The loss of visual acuteness is great, and amelioration is not to be expected. The appearance is that of spots of various sizes, often as large as the papilla, yellowish-red or whitish in colour, sometimes pigmented, which are strictly confined to the region of the macula, the rest of the fundus presenting no choroidal changes whatever." In his *Atlas* Haab remarks: "The high degree of disturbance of vision with relatively slight visible changes clearly indicates that it is the percipient elements and the pigment epithelium which are earliest attacked."

From a man, aged 77, whose right eye had to be removed in operating for carcinoma of the lids, Harms believes that he has obtained the first anatomical preparation of the affection thus described. The ophthalmoscopic note made before operation was: "In both eyes in the macular region a dark area with light spots (senile changes of the retina)." The vision of the right eye was "fingers at 1m."

The following is an abridged account of the microscopical examination:—

Retina. Even on inspection with the naked eye it was obvious that there was marked thinning of the macular region, and measurements of a series of sections showed that the extent of the thinned area was about 2mm. horizontally by 1mm. vertically; the thickness of the membrane at the centre of the macula was only 0·016mm., or about one-fifth of the smallest normal measurement in this region. The thinning was almost wholly due to disappearance of the rods and cones with the corresponding outer nuclei. At the centre, over an area of 0·6mm. in horizontal measurement, scattered remnants of the basal portions of the cones alone remained adherent to the outer limiting membrane, and internal to the membrane barely a single layer of nuclei was present; further from the centre the epithelium was less degenerate and indications of the outer elements of the cells could be seen; here the nuclear layer had a thickness of three or four cells. Many of the nuclei, instead of being round, were more or less oval or spindle shaped, as if degenerating into connective tissue cells, and on the outer aspect of the layer nuclei were not infrequently to be seen making their way through the limiting membrane, or lying external to it among the remains of the cones. Beyond a moderate degree of thinning, probably normal for the age of the patient, the other layers of the retina presented no changes, either in the central region or peripherally (with the exception of a small area to be afterwards referred to).

Pigment Epithelium. In the region of the fovea the layer of pigment epithelium presented considerable changes. These consisted in the disappearance of many of the cells, in the heaping up of the pigment into masses, and in the deposit beneath and in the layer of a quantity of a homogeneous albuminous material. More peripherally the layer was normal.

Choroid. The choroid in the central region showed no special changes; here and there there was some thickening of the walls and narrowing of the lumen of both large vessels and capillaries, but no complete obliteration of either, and to no greater extent here than in other parts of the same coat. There were no indications of choroiditis and no thickening of the limiting membrane.

It will thus be seen that the changes found in this eye differ essentially from those hitherto described, which have been mainly of the nature of small patches of choroido-retinitis and of hyaline thickening of the elastic lamina of the choroid, and that they entirely support the view of Haab that the senile affection of the macula, at any rate as described by him, depends on a primary degeneration of the percipient epithelium of the macula.

The second focus of disease to which reference has been made consisted of a patch measuring 1·5mm. horizontally by 0·5mm. vertically situated outside the fovea and a little below it. In this area the layer of nerve fibres had practically disappeared, and was represented (in section) by a row of honeycomb-like cavities containing irregular nucleated protoplasmic masses which appeared to be the remains of ganglion cells; some less altered ganglion cells remained towards the outer aspect of the layer; the other layers were not affected. The relationship of this disease to the macular condition is not apparent, and it seems possible that its occurrence in the same eye was merely accidental.

W. G. L.

Amilcare Bietti (Padua). **Entoptic Appearances during Deep Expiration and Their Significance.** *Klinische Monatsblätter für Augenheilkunde*, September, 1904.

It is well known that during deep abrupt expiration one can produce a transitory sensation of light. According to Bell, at the moment of abrupt contraction of the respiratory muscles the eye becomes engorged with blood as a result of the venous engorgement elsewhere. Bell considered that the sensation of light was to be sought in a contraction of the lids opposed to the congestion of the blood-vessels, which may be for the purpose of protecting the delicate venous plexuses of the eye. The appearances may be explained in a similar way to the light sensation which may be produced in the dark by applying pressure to the eye through the closed lids.

Hess tried some new experiments: he found that by rapid and energetic expiratory movements resembling coughing and sneezing he produced considerable general venous engorgement. If these experiments were made in a darkened room he noticed at every expiration a sensation of light, which generally appeared as three or four parallel lines in the periphery of his fields of vision, with some bright spots of light. It made no difference whether the lids were open or shut. The positions of these light sensations corresponded roughly with the points of exit of the venæ vorticosæ. He considered, therefore, that the appearances were due to a raising of the retina at these spots by the distension of the underlying veins.

Nagel could not confirm these observations and raised the question whether these results in Hess's case might not be pathological instead of physiological.

Bietti therefore decided to investigate the matter for himself, and after some unsuccessful attempts saw, instead of lines, six to eight bright spots which, if joined, would have shown two parallel lines. He induced nine others to make the experiment, six of whom saw the bright spots in much the same manner. Bietti before attempting to explain the appearances made some researches upon the positions of the venæ vorticosæ in normal eyes and found:—

1. The distance from the fovea to the exit of the venæ vorticosæ:—

(*a*)	Fovea to the inferior and outer	11·20mm.
(*b*)	,, ,, ,, and inner	11·93 ,,
(*c*)	,, ,, superior and outer	12·00 ,,
(*d*)	,, ,, ,, and inner	14·20 ,,

2. The distance from one vena verticosa to another:—

(*a*)	Between the two superior	12·60mm.
(*b*)	,, ,, ,, inferior	13·07 ,,
(*c*)	,, ,, ,, outer	16·56 ,,
(*d*)	,, ,, ,, inner	15·67 ,,

These measurements are much greater than those given by Weichselbaum and also those of Fuchs. As an explanation of this Bietti suggests that shrinkage from fixing in alcohol may be the reason of the previous measurements being small.

Bietti after some ingenious experiments mapped out the entoptic spots of light and found that they formed a quadrilateral figure, the measurements of which showed a reduction of about 20 per cent. from his previously obtained figures for the venæ vorticosæ. After careful consideration he came to the conclusion that the points of light practically corresponded with the venæ vorticosæ, and that the entoptic phenomenon was due to these swollen veins pressing the retina against the vitreous. Dr. Bietti's conclusions are no doubt correct. With regard to the distances between the venæ vorticosæ that he publishes, it is possible that the previous smaller measurements were taken with compasses and that Bietti's are measurements over the circumference of the sclerotic. The fact that the entoptic points of light appear to be closer together than the scleral measurements of exit of venæ vorticosæ is easily explained. In the first place the thickness of the sclerotic has to be allowed for, and secondly the retina being lifted at these places would bring these portions of the retina closer together.

E. W. BREWERTON.

LAGRANGE and VALUDE. **Encyclopædia of Ophthalmology.** Paris: Gustave Doin.

WE have received the first three volumes of this magnificent work which is at present in course of publication, and look forward with great interest to those which are to follow. Vol. i. (800 pages and 250 illustrations) deals first with the history of ophthalmology from the earliest times down to the present day; the long and valuable paper on this subject being from the pen of Pansier (Avignon), who has devoted much time, talent and labour to this particular subject for a long time, and than whom there is no one better fitted to deal with such matters. The Anatomy of the Eye, which occupies the larger part of Vol. i., is described by various experts, Lagrange writing upon the orbit, Motais giving a really splendid article upon the motor apparatus, particularly valuable in the part dealing with the capsule of Tenon, the check ligaments, etc., Morax describing his own "happy hunting ground" the conjunctiva, Terson the lids, Rochon-Duvigneaud the retina and nervous connections, and so on. The names of the authors give a guarantee of the high quality of the work.

Vol. ii. (940 pages and 570 illustrations) deals first with the Physiology of the Eye generally (Angelucci and Sulzer), its nutrition, tension, movement, visual functions, etc.; then follow two very exhaustive papers upon the Embryology and the Teratology of the Eye from Van Duyse (Ghent), whose reputation is second to none in the special subject. His treatises, for they deserve that name, they are so full, so profusely and instructively illustrated, are most valuable in themselves, and are followed by a very copious bibliography. The third section of this volume is occupied by a very learned article by Motais upon the Comparative Anatomy and Physiology of the Eye in Man and the Lower Animals.

Vol. iii. (1100 pages and 696 illustrations) is chiefly concerned with optical matters. Broca writes the opening chapter upon the Geometry of Optics, then Tscherning deals with questions of Accommodation, etc. Sulzer follows with sections upon Errors of Refraction, in the course of which he developes his special views upon the progress and incidence of Myopia; Sulzer also writes upon the Functions of the Retina, including the determination of the refraction, of colour-blindness, of the extent of the field of vision and many other points all of the highest clinical importance. Broca continues the volume with a paper of great value upon Optics, the colour senses, adaptation, the form sense, etc., and Tscherning closes with an article upon the Ocular Movements.

It is obvious that over a field so wide, presided over by some of the greatest living authorities, each in his own area, it is idle to travel with the view of actual criticism in the limits to which one is obliged to restrict himself. Indeed one could do little but praise in regard to each article in each volume. We look forward with the greatest interest and with eager anticipation to the succeeding volumes.

LAGRANGE and AUGARET (Bordeaux). **Congenital Syphilis of the Eye: Gummatous Iritis: Secondary Glaucoma: Recovery.** *Archives d'Ophtalmologie*, August, 1904.

THE authors describe a case which they regard as intermediary between the more common affections of interstitial keratitis and infantile glaucoma or hydrophthalmia. The case had points in common with each of these conditions, yet certain symptoms prevented its proper classification with either one or other of them.

The patient was a seamstress, æt. 17 years, the child of a man who had died of a chest affection, probably tubercular. Her previous history was good, infantile fevers and influenza alone being recorded; but a year previously she had had a body rash and ulceration about the nostrils of uncertain nature. Her general health and condition were good. She was first seen in May, 1903. There were then seen a painless irido-cyclitis, infiltration of the lower part of the cornea, deposits on its posterior surface, and several grey granulations of miliary form on the lower part of the iris. The pupil was irregular and partly adherent to the lens; the tension was +2; the fundus could not be seen. Vigorous treatment by inunction with mercury, and the instillation of eserine into the eye, was followed; the symptoms declined. On the fourth day atropine was used, the tension at once rose but gradually declined; with a continuance of the atropine and mercury the eye cleared, the exudation was absorbed, and vision improved. The condition remained good until November, when an irregular scotoma was found in the central region, and fundus examination revealed a small grey miliary body in the region of the macula. In the succeeding March there was a severe relapse with a tension of +3, but again the symptoms declined with treatment. The possibility of the condition being tubercular was considered, and a test instituted by injection of tuberculin; for a couple of days the temperature was affected, varying from 96° to 101°F., a rash appeared on the body, but there was no alteration in the condition of the eye. The authors considered that this test negatived the possibility of tubercle. In June the eye was almost well, only traces of the granulations on the iris remained and the tags of the synechiæ; tension was normal, R.V. = $\frac{1}{2}$, L.V. = 1.

In discussing the differential diagnosis of the case Lagrange and Augaret point out that it is to be distinguished from interstitial keratitis by its general severity, and the density of the infiltration and exudation, no less than by the rapidity with which all the symptoms disappeared on treatment; and also by the marked increase in tension, which is not found in the interstitial form. They believe that the case illustrates the pathology of congenital glaucoma or hydrophthalmia; the chronic disease being set up by the blocking of the filtration passages by such heavy and dense exudate as occurred in this case.

N. Bishop Harman.

Augiéras (Laval). **Spontaneous Disappearance of Cataract.**
L'Ophtalmologie provinciale, September, 1904.

The question of the possibility of "curing" cataract by other means than surgical operation must always be one of interest to the ophthalmic surgeon, if for no other reason on account of the perennial pretensions of certain questionable persons who have hitherto reaped a considerable harvest by trading upon the credulity and timidity of unhappy victims who shrink from the more or less imaginary horrors of an operation, by holding out to them hopes of permanent benefit or "cure" through the prolonged use of various rostrums. Hitherto the attempts to cure cataract by such non-operative treatment have not been crowned with success.

A number of cases, extremely interesting in themselves, have from time to time been recorded, where "spontaneous disappearance" of cataract has taken place either with or without absorption of the lens. More particularly has the interest of scientific inquirers been revived in this question since the communications made to the Société Française d'Ophtalmologie in 1902, by Professor Badal.

Augiéras adds to the literature of the subject accurate notes of two cases in which cataracts have disappeared without surgical interference. In No. 1, a man aged 64, vision is stated to have been lost for fifteen years. An acute attack of rheumatic iritis brought him under treatment, which was successful in relieving the inflammatory condition. Subsequently the vision began to improve, and some four years after the iritic attack the lens was found to have disappeared, leaving a thin transparent capsule. The vision, when corrected by suitable glasses, was excellent.

Augiéras' second case was one in which a woman aged 51 (also a rheumatic subject, but suffering from no inflammatous condition of the iris) found the vision of one eye to be diminishing as the result of cortical striated opacities (discovered on examination) extending from the circumference of the lens almost into the pupillary area. Eight months later these opacities had nearly disappeared, and vision had greatly improved. This happy result Augiéras attributes partly to scanty ("starvation") dietary rendered necessary by the loss of the patient's purse whilst travelling abroad. How long this starvation existed is not accurately stated, but it is suggested that its effect was augmented by increased physical exercise and an out-of-door life. The essential local determining cause, however, of the disappearance of the lenticular opacity is supposed to have been an attack of acute septic conjunctivitis which immediately preceded the improvement in vision.

Of course the broad principle applicable to both cases would be that any interference with the nutrition of the lens must influence its transparency or its consistency. It is conceivable that a process of absorption of the lens fibres might thus be inaugurated. That lenticular opaque areas should thus be absorbed, with restored transparency of the lens substance is hardly in accordance with general experience.

The reviewer has met with one case of spontaneous cure of cataract in an aged myopic gentleman of studious habits who for many years had an opaque lens in one eye. The other eye being extremely myopic and unaffected by cataract, an operation was not suggested. Subsequently on rising one morning the patient discovered that sight that been restored to the affected eye. On examination, the shrunken, dried-up lens was found to have dropped from its normal position to the bottom of the globe, leaving the pupil clear. The day previous to the sudden restoration of sight (locally supposed to be miraculous) the patient had slipped and fallen upon his back, with an uncommon but not altogether unaccountable effect upon the suspensory ligament of the lens in a myope of advanced years. His sight remained fairly good with a suitable glass, and no ill effects ensued. This instance of mechanical dislocation of the lens is not quoted as a parallel to the interesting cases recorded by Dr. Augiéras, but it serves to illustrate the fact that exceptional effects may sometimes follow simple and not uncommon circumstances. It is not easy, however, in these cases to find the general law which renders it possible to count upon producing the same effect under apparently similar conditions, and thus to utilise the results of experience.

A. W. S.

ENRIQUE DEMARIA (Buenos Ayres). **Experimental Researches upon the Antitoxic Action of the Tears on Diphtheritic Toxin.** *Klinische Monatsblätter für Augenheilkunde*, September, 1904.

CERTAIN specific organisms find undoubtedly a convenient abode in the conjunctival sac—the Koch-Weeks bacillus, the diplobacillus of Morax-Axenfeld and the hypothetical organism causing trachoma for instance—and in all probability the tears have very little if any germicidal or antitoxic power with regard to these. On the other hand, diphtheria of the conjunctiva is uncommon, and when it occurs is often of a very mild character. The question whether this is due to the action of the tears may be considered from various points of view. In the first place, the mechanical effect of the tears must be allowed, and in the second, the suitability of the soil; for example, the person may be already immunised against the particular organism. Van Genderen Stort, Bernheim, Bach, and more recently von Schirmer, have all made experiments to show that the beneficial effects of the tears is due merely to the mechanical flushing of the conjunctival sacs. Other effects, however, may be caused by the tears. It is possible that they may act directly on the organism, either inhibiting its growth or actually causing its death; and, lastly, they may have an antitoxic power over the toxins produced by the organisms.

Demaria decided to investigate the matter, and chose the diphtheria bacillus as the most suitable for his experiments. Previous work on this subject by Gossetti and Jona showed that in animals the tears had no germicidal effect on the Klebs-Loeffler bacillus. They mixed a measured quantity of tears with virulent diphtheria bacilli, and found that the bacilli were inhibited neither in number nor in virulence. De Bono and Frisco found that if tears were injected into a guinea-pig with a lethal dose of diphtheria toxin the animal died, but if the tears were left in contact with the toxin for six hours previous to injection, the animal escaped. This result they ascribed to the chemical action of the tears on the toxin. Coppez made similar experiments, and came to the conclusion that the tears had no antitoxic power. Rymowitsch, experimenting with dogs immunised against cholera and against typhoid, came to a similar conclusion. In very few of these experiments does it appear that human tears were used.

In all of Demaria's experiments diphtheria toxins in carefully measured doses were employed, as he very rightly holds that it is impossible to work accurately with the living organisms. Human beings undoubtedly have very different powers of resistance with regard to diphtheria toxins. Wassermann has stated that even in normal persons, with the exception of the newly-born, a definite antitoxic body can be obtained from the blood; it is possible therefore that traces of this may be found in the tears. In one set of experiments Demaria used artificial tears made up from Bach's formula, but in all the others human tears, after carefully testing to prove their sterility; the diphtheria toxins were obtained from Professor Ehrlich's laboratory in Frankfort.

Experiments. (*a*) The action of artificial tears upon diphtheria toxin. The experiments were made on guinea-pigs, and a control was used in every case. The toxin was mixed with tears and injected, the result being negative in every case, both animals dying about the same time. The natural conclusion was that the chemical constituents of the tears can have no effect. (*b*) The action of human tears on diphtheria toxin. The tears were all alkaline and sterile; results again negative. (*c*) Experiments on the tears of persons who had been immunised against diphtheria. Three students and Demaria himself submitted themselves to the experiments, the result in each case being negative. Lastly, a child just recovering from diphtheria of the fauces again gave a negative result.

Demaria concludes, therefore, that no antitoxic body is present normally in the tears, nor even in immunised patients is there any antitoxin to be found in the tears. The absence of antitoxin in these latter cases is of some physiological interest as it denotes that the lachrymal gland is capable of preventing the passage of the antitoxin which we know is circulating in the blood. He advises that further experiments be undertaken on the lines of De Bono and Frisco.

Demaria has confirmed the previous work on the subject, and has shown definitely that nothing can be ascribed to the tears which cannot be explained by the continuous mechanical flushing of the conjunctival sacs. If there is anything beyond this required to account for the fact that such a small percentage of eyes suppurate after operation it may eventually be found to lie in some special resistant action of the conjunctival epithelium, and in our opinion work in this direction is more likely to repay research.

E. W. Brewerton.

Villard (Montpellier) and Delord (Nîmes). **The Histology of the Repair of the Corneal Wounds consequent on Paracentesis.** *Archives d'Ophtalmologie*, August, 1904.

The authors remarks the rarity of such observations owing to scarcity of opportunity. A man, æt. 52 years, under their care, suffered from an intense syphilitic iridocyclitis. He had contracted the primary sore at the age of 32, and developed typical symptoms of locomotor ataxia at 48. The inflammation of the eye was of the most intense nature. The iris was infiltrated and almost obscured by a large hypopyon, the surface of the cornea was absolutely intact and free from epithelial erosion. There was a great increase in tension, and the pain was so severe that sleep was impossible. They performed paracentesis of the anterior chamber and evacuated the hypopyon with great relief to the patient for the space of 24 hours. Then the symptoms recurred with redoubled violence and vision was "totally suppressed." So desperate was the condition of the patient that they amputated the anterior segment of the eyeball. There was an immediate relief of the distress and recovery was rapid. The excised portion of the eye was preserved in 10 per cent. formaline.

They describe and figure the condition of the cornea with the wound, the iris, ciliary body, and the mass of the hypopyon. The wound was found to be a clean cut, penetrating well into the anterior chamber, but it was quite blocked up, from the outside by the ingrowth of a long plug of surface epithelium which had reached as far as half-way into the substance of the cornea, from the inside by a plug of fibrinous material continuous with the hypopyon; the small intermediary portion was packed with leucocytes. The most marked feature of the cornea was the total disappearance of Bowman's membrane in that portion between the wound and the scleral margin, it was replaced by a soft vascular growth of connective tissue. The hypopyon had a general granular matrix with an uneven mixing of formed elements: these formed elements were most numerous in the deeper layer next the iris. They were leucocytes, poly- and mono-nuclear, disassociated nuclei, broken-down red blood cells, masses of hæmoglobin, and some cells which were undoubtedly derived from the anterior cells of the iris endothelium. The iris showed all the signs of an intense inflammation, in engorgement of vessels, profuse infiltration of leucocytes, alteration in form of pigment cells and increase of fixed tissue cells and "Mastzellen;" the changes were most marked in the ciliary region. In the ciliary body were similar changes, with indication of the absorption of pigment by the infiltrating leucocytes.

N. Bishop Harman.

CLINICAL NOTES.

Opaque Nerve Fibres.—Recently two cases of this condition of unusual interest have been published. Gilbert's (Bonn) patient was a Jew, aged 49, who consulted him solely on account of presbyopia. From youth he had, he knew, seen but indifferently; on correction of (unequal) low degrees of hypermetropia he obtained $^2/_5$ and $^2/_7$ vision. The ophthalmoscope showed in the left eye at and about the papillary region, a somewhat oval area, the long axis being vertical, of glittering white opaque nerve fibres with feathered margins in all directions. In size this area was vertically about 4½ disc-diameters and horizontally about 3. Its least width was on the macular side, where, about opposite the centre of the disc, it became much narrowed. The vessels, which were very similar in arrangement to the average normal, cropped out in the midst of this white area and were not again hid from view. There was nothing else noteworthy in the fundus, and there were no striking differences between one eye and the other. It is particularly to be noticed that the macula was not invaded, for in this respect the case forms a contrast to that of Hawthorne (London). In his patient the fibres were not opaque on the disc except in a very small part, but the medullated fibres were to be seen completely encircling it, which is unusual, and this ring of opacity became enormously broader towards the macula, extending up to it and even for a considerable distance beyond it. A singular feature of this macular portion of the opaque fibres was the loss there of the usual bright, glistening aspect; the patch was in this region quite dull and "dead" looking, though quite characteristic. The eye was completely blind, had not even perception of light, but its fellow, in which there was no unusual appearance, was normal except for a slight degree of astigmatism.—*Klinische Monatsblätter für Augenheilkunde*, July-August; *Ophthalmoscope*, September.

Sympathetic Amblyopia.—Prof. Nuel, of Liège, returns to this rare form of sympathetic trouble in a paper read before the Royal Academy of Medicine of Belgium. He says he has now seen 22 cases of this condition, whose importance, indeed whose existence, he thinks is not so universally admitted as he should like to see. Sympathetic amblyopia begans somewhat later, counting from the date of the original injury, than the sympathetic inflammatory affections. Usually the patient complains for months of recurring obscurations of vision, specially apt to come on just when he wishes to use the eyes; on testing at such a stage the vision will be found slightly reduced, and the field of vision perhaps slightly encroached upon. There is sometimes photophobia, photopsiæ are complained of, and there are vague pains about the temples and forehead. Once the disease is firmly established central vision may sink as low as to $^1/_5$th, $^1/_{12}$th, or even less, and the field is extremely narrow. All this time the ophthalmoscopic appearances may be *nil*, but there may be a little blurring of the disc (? neuritis), pallor of the temporal side of the disc, evidence of perivasculitis in the disc, or slight dilatation of the veins of the retina. In this manner the condition may go on for months or even years with alternating remissions and aggravations, and may eventually disappear altogether, not leaving behind any trace even of deficiency in sight, but more usually resulting in a greater or less degree of amblyopia. Nuel has never seen complete blindness follow. During the time when all these symptoms are present, even when they are at their worst, the condition of the originally injured eye is generally one of complete quiescence. As regards the very important matter of prognosis, it is true that there is very little danger indeed of total loss of sight, yet the disease is so prolonged and so uncertain in its behaviour that the working capacity of the patient may be annihilated; for at first, while the vision is usually good, there are those recurring attacks of amblyopia, especially just when the eye is being used, and later on the acuteness of sight is lowered, perhaps permanently lowered. For a theory of the pathology, Nuel proposes the following:—It is known that after injury to an eye a process of mild neuritis is not uncommon, this process leading to a certain degree of sclerosis of the nerve, but usually ceasing at the optic foramen; in the cases under consideration this process may have extended up to the chiasma and there involved the fibres of the optic nerve of the other eye. It is obvious that the boundary separating this disease from a neurosis is very narrow indeed, and that the symptoms could all be quite readily simulated by a skilful person, but this does not of course mean that no such affection actually exists. It only means that, especially in cases involving legal questions, one must be very much on one's guard so as to be able to distinguish between a genuine disease, a neurosis, and a fraud, lest we should be guilty of the mistake either of enriching the swindler or denying to the genuine sufferer his rightful claims. [We may remark for the benefit of any who may desire to read Nuel's paper in the *American Journal of Ophthalmology*, that the translator has apparently employed the English word "sympathizing" as though it were the equivalent of the French "sympatisant," which it is not, and the mistake has in certain passages concealed rather than made plain the sense of the distinguished author.]—*American Journal of Ophthalmology*, July, 1904.

THE WRECK OF THE "AUSTRALIA."—On the morning of the 20th June, 1904, the P. & O. steamer "Australia" was wrecked on the Corsair Rock, at the entrance to Port Philip Harbour. Barrett and Orr had the opportunity of examining the visual condition of the pilot who was in charge at the time, and write commenting upon the facts which were elicited. He seems to have been perfectly sober, his colour vision, as tested by means of Holmgren's wools, was normal, but "tested by luminous discs, considerable illumination was required to elicit a satisfactory discrimination of some of the colours." This is too vague a statement to be of much value, but as regards central vision the report is more definite, for he was found to have 3·0 D. of myopia with 0·5 D. of astigmatism; with this correction he had $^6/_9$ in right eye and $^6/_6$ in left, but without lenses he only had $^6/_{36}$. A point of considerable interest is that the same pilot was in charge when on 10th March, 1904, another steamship, the "Indraghiri," was wrecked at the entrance to the harbour. Like many other myopes of low degree, this man rather prided himself upon his sight, because at his age (59) he could read small type without the assistance of glasses, and was quite unaware that his distant vision was bad. Of course he used binoculars, but it is not desirable that a pilot should be so completely dependent upon them as he must have been. The Marine Board of Victoria has made certain new regulations in regard to the vision of pilots since this accident, including these:—That the vision must be $^6/_6$ in each eye without glasses, and that the error of refraction must not exceed 1 D., tested under a mydriatic; colour vision is to be normal.—*Lancet*, 29th October, 1904.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

The President, Mr. JOHN TWEEDY, in the Chair.

Clinical Meeting held December 8th, 1904.

CASES AND CARD SPECIMENS.

Tumour of Optic Nerve.—Mr. E. Harries Jones.

The patient, a shoe finisher by trade, and aged 34 years, had attended the Northampton Hospital on June 1st, complaining of pain in the right eye. On examination, the vision had been found to be $^6/_6$, and ophthalmoscopically there had been noted some hyperæmia of the disc with fulness of the veins. Twenty-eight days later, though the vision remained as before, some proptosis had been found and the ocular movements were slightly restricted in all directions. A month later the vision had fallen to $^6/_{36}$ and the proptosis had become more marked. A month after this the orbit had been explored and a soft rounded mass had been felt in the region of the optic nerve. Later still, optic neuritis with retinal hæmorrhage had been present with slow increase of the proptosis. Potassium iodide had been given throughout and the vision had improved, though the proptosis had remained much the same. No specific history could be elicited, the urine was normal, and in every other way the patient appeared healthy.

Infant with double Proptosis.—Mr. G. W. Roll.

The patient, a boy aged one year and two months, was mentally deficient but not deaf; he possessed a large head with prominent parietal eminences and unclosed fontanelles, and though he had never made any attempt to walk still he was quite able to sit up in bed without assistance. Both eyes were markedly proptosed to about the same degree, showed deficient movements, and were divergent, together with lateral nystagmus. Both sclerotics had a bluish tint, and both pupils were dilated and did not react. Both eyes were apparently blind, and the discs showed an equal degree of grey atrophy. No changes could be made out at the macula in either eye. In the submucous tissue of each cheek was a nodular tumour which showed a firm and definite outline and was freely movable in the tissues. Similar swellings were found in the groins and there were also enlarged glands on both sides of the neck and beneath the jaw.

A Case of Orbital Exostosis in a Child.—Mr. Arnold Lawson.

In this patient a hard bony exostosis could be felt at the upper and inner angle of the orbit. The tip of the exostosis felt movable to a slight extent in all directions.

A Carton of Aseptic Sterilised Dressings for Intra-ocular Operations.—Mr. Arnold Lawson.

This comprised a round cardboard case in which were contained sterilised absorbent wool, pads of gamgee tissue, several layers of gauze, and a roller bandage. The gamgee tissue was cut into two large pads from which several eye pads could be made if necessary, the gauze, of which there is enough and to spare for any eye operation, was double-cyanide, and the absorbent wool was in sufficient quantity for the purpose of swabs and to make a pressure pad if required.

Congenital Anterior Staphyloma.—Mr. Arnold Lawson.

In this patient, a child, both corneæ presented a marked bulging staphyloma, with no anterior chamber and the iris adherent to the back of the cornea, and greatly stretched. Both corneæ were more or less opaque, in some places more so than in others. There had been no history of discharge from the eyes indicative of ophthalmia neonatorum, and the condition had moreover been noticed by the medical man who attended at the birth of the child.

Two Cases of Senile Choroiditis.—Mr. A. Hugh Thompson.

Case i. The patient, a female aged 63, had a markedly divergent right eye with which she stated she had never been able to see much, and latterly (for the last five years) the sight had failed greatly with the left eye. Ophthalmoscopically, in each central region, involving the macula, a large round area of superficial choroidal atrophy was present. The area in the right eye was some two disc diameters in size, and in the left it was about three times the area of the disc. In the left eye the choroidal vessels near the centre of the patch were markedly sclerosed, and showing up against the white background were numerous fine vessels crossing the sclerosed choroidal vessels apparently retinal, though no connection with the retinal vessels could be traced. To the outer side of the macula three large choroidal vessels forming loops were seen, none of which reached the macula, the upper one appeared to come to a sudden stop while the middle and lower ones formed a loop.

Case ii. This patient, a woman aged 78, stated that her sight had been failing in both eyes for some eight months. Ophthalmoscopically in each eye was seen a large rounded patch of choroidal atrophy extending from the macula downwards, and symmetrically placed in each. Each patch was some three disc diameters in size and presented superficial choroidal atrophy, with, however, some retinal pigment still remaining in the immediate macula region, and large choroidal vessels which did not appear to be sclerosed. A second area of choroidal atrophy surrounded each disc, much wider on the temporal side in each case, and directed towards the large patch below the macula, and evidently caused by the contraction of the large patch, from which it was separated, however, by a band of normal choroid. Each atrophic area showed a well-defined pigmented margin.

Posterior Lenticonus.—Mr. C. Devereux Marshall.

The patient, a woman aged 23 years, had noticed her right eye becoming defective for about twelve months. At first sight there appeared to be a posterior polar cataract, but a closer examination proved this to be a central patch about $\frac{3}{4}$ of the size of the undilated pupil having a different refraction from the rest of the posterior surface of the lens, and perfectly transparent with no opacity in it whatever. This condition was considered to be congenital.

Cyst of Krause's Gland.—Mr. G. W. Thompson and Mr. Edgar Chatterton.

The patient, a woman aged 25, showed a marked degree of ptosis of her left upper lid, which was found to be caused in great part by an elastic but firm swelling occupying the inner two-thirds of the lid. This was about the size of a small pigeon's egg and prevented complete eversion of the upper lid; it projected into the upper cul-de-sac. When she was thirteen years of age this upper lid had been cut by the corner of a swing, and the lid still showed the scar. The patient stated that this swelling had been gradually growing since the accident. The cyst was removed, and the microscopical examination showed it to be a large unilocular cyst lined with epithelium, the cyst wall consisting of fibrous tissue, and the epithelium of a double layer of cubical cells in some places, and a single layer in others, the lumen of the cyst remaining clear.

Congenital Abnormalities of the Retinal Vessels in two Sisters.—Mr. George Coats.

Case i. The patient, a girl aged 10 years, was hypermetropic and showed nothing abnormal in the left fundus, but in the right showed a peculiarity in the branching of the inferior artery. This divided normally into two branches, the inferior nasal, which continued its usual course, and the inferior temporal, which gave off—a little way beyond the disc—a large trunk which first ran outwards, then curved upwards, and passed about half-way between the disc and the fovea; about the level of the disc it was directed outwards again and met the superior temporal vein which it accompanied to its termination, this vein having in consequence a large artery on either side of it. Just below the abnormal artery was a small yellow spot, but otherwise the fundus was normal.

Case ii. The above patient's sister, aged 5 years, was also hypermetropic and showed nothing peculiar in the left eye. In the right eye the inferior nasal vein did not join the inferior temporal to form a common trunk but reached the disc separately. A single trunk was formed by the junction of the two main branches from the nasal and inferior nasal part of the fundus respectively; this trunk, immediately after crossing the edge of the disc, divided into two equal branches which entered separately into the papilla. The upper fork received also a small tributary from above. Another sister also presented some abnormality in the distribution of the arteries in one eye.

Demonstration of Dr. Meisling's Colour-mixing Apparatus.—Mr. J. W. Tomlinson.

Recurrent Orbital Tumour.—Mr. Leslie Paton.

The patient, a woman aged 38, had been seen for the first time in May of last year with proptosis of the right eye, together with its lateral displacement, caused by a swelling behind the inner canthus and on the inner wall of the orbit. The vision at this time was normal, and there was no actual diplopia. A small piece of the growth was removed and as it was thought to be inflammatory in character, the patient was put upon mercurial inunctions and increasing doses of potassium iodide up to 90 grains daily. Later, the displacement became more marked and—it having been decided to remove the growth—this was done on Sept. 20th. During the operation, the intimate adhesion of the growth to the skin at the inner canthus caused some difficulty. The growth was then found to extend to the posterior angle of the orbit, but it was removed without sacrificing the eye. It had since occurred, and the fact of its rapid recurrence locally, together with the microscopical appearance, indicated it to be of an endotheliomatous nature.

Grafting Frog's Mucous Membrane for Symblepharon.—Mr. Leslie Paton.

The patient, as the result of orbital cellulitis, had had his lower conjunctival sac almost obliterated, the lower lid was adherent to the lower margin of the cornea and to the conjunctiva above this level on either side of the cornea. The lower lid had been dissected away from the eyeball and the resulting raw surfaces were covered by mucous membrane taken from the roofs of the mouths of three frogs. One portion had sloughed away, but the others had remained and grown well, and since the operation twelve months ago no shrinking of the sac had taken place.

Results of Wound of the Sclerotic.—Mr. George Keeling.

The patient, a lad aged 10½, had suffered from a perforating wound of the right sclerotic together with other injuries, the result of playing with a dynamite cartridge which had exploded. The wound in the sclerotic had been closed by two sutures and had healed rapidly, the boy eventually leaving the hospital with good vision. The accident happened in June, and in November the vision had been completely lost. The pupil had become displaced inwards by organised lymph, by which it was also seen to be occupied; this was adherent to the iris, to the opaque lens, and to the opaque suspensory ligament, together with several ciliary processes, and these were all in the upper ¾ths of the pupil. Through the lower ¼ of the pupil a yellowish mass of retinitis proliferans could be seen. The scar of the wound could be seen in the outer and upper part of the sclerotic.

Case of Unusual Sympathetic Ophthalmitis.—Mr. Harold B. Grimsdale.

The patient, a woman, aged 42, had suddenly lost the sight of the left eye some months previously, and at the same time had suffered great pain in and around the eye, particularly in the supra-orbital region. A large detachment of the retina had been seen later in this eye, and the pain continued more or less. Excision not being permitted, drugs of various kinds had been given without, however, much beneficial result. The left lens gradually became opaque and the iris became bound down, without any symptoms of inflammation. Keratitis punctata was then noticed on the right cornea and later blurring of the right optic disc with fulness of the veins.

New Vessels in the Vitreous Following Recurrent Hæmorrhage in the Vitreous.—Mr. A. S. Morton.

The patient, a labourer aged 28, had had hæmorrhages first into the left vitreous, then into the right. Both vitreous were hazy and filled with fibrinous masses. In the right fundus the superior temporal vein, near the periphery, crossed a small long-shaped patch of choroidal atrophy. The vitreous was full of fine opacities and on the patient looking up a large sheath of capillaries with looped anterior ends could be seen the most anterior portion; these were best seen with a + 12D lens.

Abnormal Congenital Pigmentation of one Eye.—Mr. N. Bishop Harman.

The patient was a boy aged 15 years, the seventh child of a family of 12. The right eye was deeply pigmented in sclera, iris, and fundus, and contrasted markedly with the lesser degree of pigmentation of the left eye, which had a very white sclera. The fundus was of a deep slatey-black colour. This pigmentation apparently came on when the child was a year old and was noticed by the parents. The vision of the eye was normal. Neither of the parents was dark skinned.

Reginald C. Bickerton.

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RETINITIS PUNCTATA ALBESCENS.

By Dr. C. Pascheff, Sofia, Bulgaria.

To the category of the extremely rare pathological alterations of the retina — retinitis circinata, retinitis striata, etc.,—which are not yet acknowledged by all oculists as separate clinical types, belongs also retinitis punctata albescens.

The first to draw attention to this new variety of retinitis was Mooren. In spite of the fact that the description of his case is insufficient, the impression which the retinal alterations —"the retina and chorioid seem as though they were pierced by a great quantity of small holes through which one can see the dull reflex of the sclera"—brings clearly to the mind the clinical picture of retinitis punctata albescens, the subject of this paper.

One year after Mooren, our distinguished teacher, Prof. Gayet (France), published his case of retinitis punctata albescens, under the title: "On a Congenital Lesion of the Retina."[1] This case is considered in the present ophthalmic literature as the first well-described and true retinitis punctata albescens. The principal features of this case are the distribution of several hundreds of white spots over the whole eye-ground of both eyes, and principally about the region of the macula lutea and papilla nervi optici, situated behind the retinal blood-vessels and independently of them; night-blindness; concentric limitations of the fields of vision; as etiology—consanguinity.

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1. A. Gayet. "D'une Lésion Congènitale de la Rétine," *Arch. d'Ophtalmologie*, 1883, p. 231.

Some years later, Prof. Fuchs[2] published a new similar case, observed in a boy twelve years of age, and endeavoured, with his well-known faculty of strict observation, to give to this kind of retinal changes a more definite form, capable of differentiating them from all other retinal inflammations with which they were very often confused, and thus to create a new typical affection of the retina. The principal features which he pointed out as characteristic of this type of retinitis are the above-mentioned white spots over the fundus of both eyes; that the affection is found generally in young individuals, and often in several members of the same family; concentric limitation of the visual fields; diminution of the central vision, and night-blindness existing from childhood. As to the etiology, he points out also to consanguinity.

Four years ago our friend Dr. Wüstefeld,[3] an ex-assistant of Prof. Pagenstecher, published another similar case which he had observed while voluntary assistant in the clinic of Prof. Mellinger (Basel), in a girl eight years of age. There were the same pathological fundus changes, night-blindness of long-standing, concentric limitation of the visual fields, especially by reduced light (Förster's Photometer—$^1/_{306}$), but unknown etiology.

Besides these three typical and similar cases, we meet also in the literature of the subject those of Nettleship, observed in a young man of 21 years (Panas[4]); the others must be excluded from this group of retinitis, because they were accompanied by pigmented spots in the retina.

[2] E. Fuchs. "Uber zwei der Retinitis pigmentosa verwandte Krankheiten (Retinitis punctata albescens and Atrophia gyrata chorioideae et retinae)," *Arch. fur Augenheilkunde*, 1896, xxxii., p. 111.

[3] Dr. F. Wuestefeld. "Zur Casuistik der Retinitis Punctata Albescens," *Zeitschrift f. Augenheilkunde*, B. iv., 1900, p. 110.

[4] Panas. *Traité des Maladies des Yeux*, Vol. I.

The case which, four years ago, we had the honour to observe in the Ophthalmic Hospital in Sofia (Bulgaria) by its clinical picture can be fully taken as a typical example of retinitis punctata albescens. It refers to a boy of 14 years old with the following history and present state:—

For the last 7 or 8 years he has suffered from night-blindness which is inconstant and appears indefinitely. Now he sees better in the evening than 5—6 years ago. He is the only member of the family and has never been ill. There is no consanguinity in the family, nor any congenital defects, but a great probability that the father has suffered from Lues. The patient is well-developed for his age, with moderately hypertrophied lymphatic glands in the neck.

Right Eye. The lacrymal organs, the palpebræ and the conjunctiva are normal; the eyeball of a normal tension; the cornea, anterior chamber, iris and pupil are also normal. The refractive media are perfectly transparent. The fundus presents the only and principal alterations.

Around the papilla, around the macula, and in the whole temporal region of the retina, are to be noticed several hundreds of small, quite separate, white spots, which lie in the deeper layers of the retina and paint the eye-ground as the stars do the celestial vault. Some of these spots are round and with clearly defined limits, others are oval, a little longer, and with faintly indefinite margins. They are scattered all over the fundus without any fixed direction, and independently of the blood-vessels, which pass over them and are quite normal. The retina has a normal aspect and presents no pigmentations, either around the mentioned spots or in the retinal empty spaces.

The papilla is of a normal colour and appearance. Central vision $^6/_5$ (Snellen); the refraction is emmetropic.

Left Eye. Here are found the same white spots in the fundus; they seem to be more numerous in the left half of the retina. The vision and refraction are the same as in the right eye. The examination of the *visual fields* gives a concentric diminution of them. This diminution is slight in degree and seems to be more manifest for white and for blue; it becomes more marked with the decrease of the light. Urine normal.

The patient was examined by the surgeon for venereal diseases attached to our hospital, and was found to suffer from Lues hereditaria, for which he was submitted to a mercurial treatment. For this purpose he remained in the section about one month and a half. When he left the hospital the night-blindness had almost disappeared, and many of the spots seemed to have lost their brilliancy and definite limits, which gave the impression that they were diminished in their number. The visual fields in the ordinary light were almost normal, but slightly diminished in a feeble light.

Here we shall mention, by the way, another similar case which we observed some time ago in the clinique of Professor Pagenstecher (Wiesbaden), where we had the honour to spend about one month and a half.

A girl of 18 years has presented herself on account of strabismus convergens. On examining the interior of the eyes we discovered that she suffered from retinitis punctata albescens. She complained also of night-blindness dating from childhood, but which seemed not to be of a great degree. The refraction in both eyes showed hypermetropia with *amblyopia ex anopsia* of the right eye. The etiology remained unknown.

These two cases which we have observed come to affirm, once more, the existence of retinitis punctata albescens as a *separate* disease of the retina, just as Professor Fuchs has described it in its principal features. That which distinguishes our first case from all the other cases described up to now, and which adds to it a special clinical interest is its etiology—the Lues. In regard to the pathological anatomy of this new kind of retinitis we know nothing positive.

Professor Gayet and Professor Fuchs localise the alterations in the pigmented retinal epithelium, which disappears in the region of the above-mentioned spots. In this way they consider them as of atrophic nature and identify the disease with retinitis pigmentosa. Professor Gayet bases his opinion upon the clinical picture which he observed in the sister of his patient, where both these forms of retinitis were present, and mixed. Dr. Wüstefeld has observed the same thing in the brother of his patient.

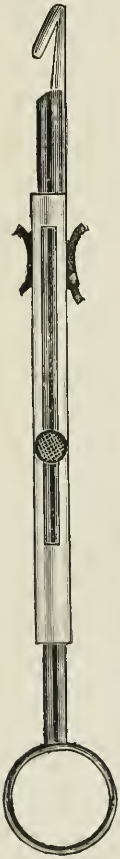
Another hypothesis as to the anatomical nature of retinitis punctata albescens is that which admits an inflammation of the external retinal layers. In favour of this opinion speaks the only microscopical examination made of this retinitis by Wedl and Bock, who have found in the external retinal layers small, round, separate, dispersed and empty spaces. According to them, this kind of retinitis is nothing else but an œdema of the retina.

In our case, taking into consideration its old-standing and clinical picture, we are more inclined to accept a congenital atrophic process of the pigmented retinal epithelium, than a fresh inflammatory process. In this regard we partake altogether the opinion of Professors Gayet and Fuchs.

A NEW INSTRUMENT FOR IRIDOTOMY.

By Dr. C. Pascheff, Sofia, Bulgaria.

In order to facilitate the iridotomy I have endeavoured to devise a better form of instrument for performing this operation, which now-a-days is very little done except in the case of aphakia.



My aim was to construct such an instrument as can help us in doing the operation, not only when it is required for optical reasons, but also in the cataract operations where an iridotomy may perhaps prove quite efficient as an iridectomy.

At last I succeeded in evolving such an instrument, which I think may well be of great use in these cases. The principle of this new instrument is very simple (see the figure).

The *iridotome** consists of two lancets gliding one within the other. The one terminates with a kind of cutting hook, which is intended to go below the iris; the second terminates with a blade destined to cut through the part of the iris included between the two. These two lancets can be taken apart and sterilized.

The instrument was to have been exhibited at the last Congrés français d'Ophtalmologie (March, 1904), but was not presented because I was absent.

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* The first model was made by the well-known house for surgical instruments at Paris, ——*Collin* (April, 1904).

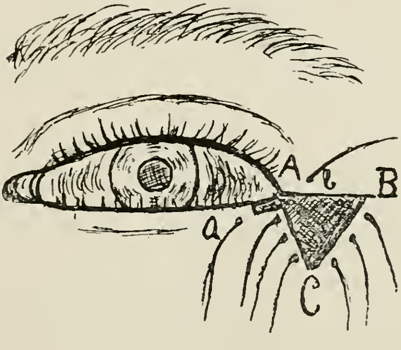
AN OPERATION FOR THE RELIEF OF SENILE ENTROPION.

By Dr. Lewis McMillan, Glasgow.

An operation for senile entropion of the lower lid, which I have not seen described in the usual text-books, and which will prove more satisfactory than the usual one of excising an elliptical piece of skin from the lower lid, is performed as follows: —

The outer canthus being split and the incision extended outwards from A. to B., a triangular-shaped piece of skin, A. C. B., with its base formed by the lower margin of the incision, A. B., is removed, a small piece of the margin of the lower lid at A. being also subsequently removed. Horse-hair sutures are now passed from side to side to close the opening A. C. B. Three will be sufficient, an additional one being passed from the border of the lower lid at *a* to the skin above the primary incision at *b*, if thought necessary. The lid is thus tightened up by being drawn outwards, and the eyelashes are everted. There is no resulting deformity following the operation.

See accompanying Diagram.



REVIEWS.

ENSLIN and KUWAHARA. **Suppurative Meningitis as a Result of Enucleation.** *Archiv für Augenheilkunde,* September, 1904.

THE idea that suppurating eyeballs ought never to be excised on account of the danger of meningitis was strongly advocated first by v. Graefe in 1863[1] and again by Alfred v. Graefe in 1884.[2] In England, however, the practice has been very general, and while it has been condemned by some authorities, it has been defended by many others. Nettleship, writing in 1886,[3] although he relates a case of his own in which death from meningitis was the undoubted result of excision of a suppurating globe, and although he refers to 14 published cases in which a similar fatal result took place, yet concludes that the risk of meningitis depends more on the fact of the eye having been wounded or otherwise perforated than on the presence of visible pus in the eyeball. Marshall,[4] writing ten years later, goes further in defending enucleation in these cases. After needlessly injuring his own contention by misquoting Nettleship,[5] in whose collection of 34 cases meningitis followed excision in all conditions, not only suppuration of the globe,[6] he goes on to give details of 8 cases in which meningitis did follow excision of suppurating globes at Moorfields between the years 1881 and 1896. Nevertheless, he points out that meningitis is not unknown after panophthalmitis without excision, and concludes that the operation, far from hastening the fatal result in these cases, is the very best treatment that can be adopted, because it provides efficient drainage. With regard to the alternative operation of evisceration, he says that "as the products of putrefaction may have soaked into the sclerotic and have infected the surrounding parts, it is far better to remove it."[7] He admits, however, by implication at any rate, that the operation of enucleation is not free from danger, for he utters a warning "to be extremely careful when removing a suppurating eye not to allow the contents of the globe to come into contact with the recently-cut orbital tissues, lest absorption and fresh suppuration be the result."

The paper here reviewed is entirely opposed to the position taken up by Marshall in advocating enucleation, and though the views put forward are only supported by the evidence of a single new case, that case is a very important one. It was that of a woman of 64 with an eye which had been chronically inflamed and painful for a year or more, after an infective corneal ulcer. The eye was quite blind, and enucleation was performed on account in the first place of the pain, and in the second of the possibility of sympathetic inflammation. The operation was rendered difficult by adhesion of the conjunctiva to the eyeball and by the softness of the latter, the result being that a buttonhole was made in the posterior part of the sclerotic. Symptoms of acute meningitis rapidly followed, and 58 hours after the operation the patient died. Both the enucleated bulb and the remaining contents of the orbit, including the nerve with its sheath, were examined microscopically as well as bacteriologically. The interior of the eye (vitreous chamber) and the space between the nerve and its pial sheath were occupied by pus with numerous streptococci. In the nerve itself there was only evidence of chronic interstitial inflammation. In the washings from the orbit taken before the death of the patient, streptococci were found. Yet, to the naked eye there was no evidence of acute inflammation in the orbit at all; and, moreover, the orbital nerves, including the sixth, were quite normal. This case then proves that the absence of all macroscopic evidence of any connection existing between orbit and inflamed meninges is quite insufficient to prove that no such connection exists. In this case at any rate the presumption is strong that the buttonhole made in the sclera let loose bacteria which infected the freshly cut tissues of the orbit and that meningitis was the result; and so far as it goes this case strongly supports the view that in panopthalmitis enucleation is contraindicated. As the bulb in these cases is generally soft, it is impossible to be absolutely sure that the accident of buttonholing it may not occur. With the operation of enucleation, on the other hand, the danger of infecting the orbital tissues is much less, but even here it must not be overlooked, for in case a perforation of the sclerotic has already taken place, the peribulbar abscess is generally localised by the previous formation of fibrous tissue outside the weak spot. If this is rashly disturbed by a sharp spoon, the result may be equivalent to buttonholing the bulb in excision. In such a case, therefore, it would be better not to operate at all, or by merely incising the sclerotic to provide a free exit for the pus. There is another possibility on which the authors of this paper do not touch, namely, that mentioned by Marshall, that the products of putrefaction may have already soaked into the sclerotic without perforating it, so that to leave the sclerotic would itself be a source of danger. This danger, however, would appear not to have been present in their own case, for the microscopical examination revealed nothing in the sclera except a few collections of lymphocytes here and there, between the scleral fibres.

The controversy cannot as yet be considered at an end. Out of 21 of the cases collected by Nettleship in which meningitis followed excision, in only four was the interval between the operation and the onset of head symptoms more than 48 hours, a circumstance that points strongly to a causal connection between the two. One precaution should at any rate never be omitted after excising eyes which are suppurating or which have been perforated from any cause: namely, a tight bandage should never be left on for more than four or five hours.

A. H. T.

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4. *Royal London Oph. Hosp. Reports*, xiv., p. 312.
5. *Ibid.*, p. 323.
6. *Trans. Oph. Soc.*, Vol. vi., p. 461.
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ARTHUR SCHUSTER (Manchester). **An Introduction to the Theory of Optics.** London: Edward Arnold, 1904.

PROFESSOR SCHUSTER'S introduction to the theory of optics forms a valuable addition to the literature of the subject. As the title suggests, the design of the book is to ground the student in the fundamental conceptions of the modern theory and their mathematical expression and development. The work consists of two parts. The first embraces such sections of physical optics as can be treated without the equations of rigid dynamics, and includes discussions on interference, diffraction and polarisation. A useful mathematical preliminary on periodic and wave motion takes up the first two chapters. What is almost universally known as "simple harmonic motion" the author terms "normal oscillation," a change which will probably not commend itself to many. Towards the end of the book, however, in the chapter on rotatory effects, a distinct improvement in the nomenclature of the subject is introduced. Substances hitherto known as "optically active" are termed by the author "gyric" with the proper descriptive prefix as "dextrogyric, "magnetogyric." The theory as developed in chapters 3 to 8 finds application in two well-written chapters on the propagation of light in crystalline media and on the interference of polarised light, with which Part I. concludes.

The second part of the work demands from the student a higher order of mathematical knowledge than the first, but not more than he may fairly be expected to acquire during the time necessary for the study of the earlier chapters. Part II. opens with a chapter on "Theories of Light." A few sections are devoted to a discussion on homogeneous strains and stresses for the purpose of obtaining the equations of wave propagation in elastic media. Then follows a brief outline of electromagnetic theory from which Maxwell's equations are derived. Maxwell's theory is then deduced in the usual way, and application is made of both the elastic solid theory and the electromagnetic theory to the phenomena of reflection and refraction, the limitations of both theories being duly commented upon. Chapters follow on "dispersion and absorption," "rotatory effects," "transmission of energy," and "the nature of light." We may here remark that it is distinctly disappointing to find no specific notation adopted for partial derivatives. That of Jacobi occurs once or twice on page 315; but its appearance at all is evidently an inadvertence. Surely a notation now so common and so useful, especially to young students, should have found place in an up-to-date work like the present.

Two chapters may be singled out as especially serviceable and suggestive to the medical student with sufficient mathematical equipment. The first is Chapter 7, in which is given an elementary and fairly full discussion of the theory of optical instruments. Geometrical optics, for many purposes, forms a sufficient basis for practical work, but real knowledge of the degree of accuracy of which a given instrument is capable can only be acquired by a study of optical instruments from the physical standpoint. To such a study this chapter makes an excellent introduction. The second is the chapter on dispersion and absorption. It cannot be expected that the treatment of the subject matter of this chapter could be very elementary. The conditions under which the absorption of energy by the media conveying the disturbances give rise to various phenomena do not lend themselves to simple expression or exposition. The author, however, keeps constantly before him the difficulties students are likely to encounter, and anticipates the difficulty, or gives a word of warning where an erroneous interpretation is likely to be made. The methods of this chapter will be appreciated especially by physiologists.

We congratulate the author on the success with which he has carried out his design. We know of no book written with a set purpose better adapted to serve the purpose for which it was written, nor any that the earnest student of optics will find more interesting and profitable. The work itself, without the confession of the preface, shows that Professor Schuster is a teacher, and every page bears evidence that he is a master of his subject.

The book is well illustrated with cuts and plates, and has been carefully read. We have met with very few misprints, and these not likely to mislead. For example, on page 14 the statement that "The sum of the squares of x^2 and y^2 is not altered by transformation," referring to a conic, is, in effect, corrected by an equation immediately following. On page 241 in connection with the differential equation of motion of a particle vibrating in a resisting medium are subject at the same time to an additional periodic force the quantity $e\cos wt/m$ is written as the force; an error which the theory of dimensions at once puts right. We heartily recommend the book to our readers.

TERRIEN (Paris). **Syphilis of the Eye.** Paris: G. Steinheil, 1905.

IN *Syphilis de l'Oeil et de ses Annexes*, a book of some 300 pages and 40 illustrations in black and white, we have the chief facts gathered together regarding the relation of syphilis to the eye, including the parasyphilitic manifestations. The subject as dealt with is a very extensive one, for not only are such matters as chancre of the conjunctiva, iritis, and choroiditis described, but locomotor ataxia and general paralysis are treated of at very considerable length. The third section is taken up with the treatment by means of mercury and iodide of potassium. As regards mercury it would be more correct to say that it is taken up with the injection method of treatment, for exhibition of that drug by the mouth, and even by inunction, is disposed of rather contemptuously in two or three lines. All that is said of the administration of mercury by the mouth is "La méthode par l'ingestion est aveugle, très souvent mal tolérée, et en même temps inefficace car l'absorption du mercure est trés variable suivant l'état des voies digestives." This is a judgment based upon ignorance of proper methods of administration by the mouth, as has been proved in thousands of instances. It is convenient enough to have a reference in one book to all the chief manifestations of syphilis in the eye, but otherwise "Syphilis de l'Oeil" has little to recommend it.

H. Frenkel (Toulouse). **Alternating Mydriasis.** *Archives d'Ophtalmologie*, xxiv., 9, 10.

Inequality of pupils may be constant or transitory: in either case the amount of inequality may be fixed or variable. A sub-division of the variable form exists when the pupil which at one time is the larger, at another is the smaller; for this sub-division, known to the German as springende Mydriasis, Frenkel suggests the name of mydriase à bascule.

A valuable paper on an interesting but confusing subject is not rendered more lucid by the repetitions and faults of arrangement which occur in it. The symptom of alternating mydriasis has not the same significance when it is observed under altered conditions of examination that it possesses when it appears under identical conditions; the latter class comprises the cases of true or spontaneous alternating mydriasis, the former those of false or experimental alternating mydriasis. Spontaneous alternating mydriasis is not the same thing as spontaneously alternating inequality of pupils; the latter phenomenon is met with when one pupil maintains a constant size, the former when a similar exciting cause of mydriasis temporarily operates first on the size of one pupil and then on that of the other. Frenkel draws attention to the importance of an equal illumination of the two eyes when examining for the symptom of alternating mydriasis. We are quite satisfied of the importance of this precaution in all observations upon the pupils; although theoretically the size of each pupil is regulated by the combined total of the light falling on the two retinæ, a slight inequality of the pupils can frequently be recognised in perfect health if the light is allowed to fall obliquely on the face of the patient. After a brief historical survey of recorded cases of alternating mydriasis, Frenkel explains that in a previous communication on inequality of pupils in health and disease he classified anisocoria according as it appeared in the course of organic disease, of which it formed a part, or as a disorder of function in the presence or absence of other disease, or as a manifestation independent of all pathological affections; he now proceeds to discuss true alternating mydriasis on the basis of the same classification.

1. *In Organic Disease.* General Paralysis. This is the disease of the central nervous system in which true alternating mydriasis is most commonly encountered. The alternations may take place in a few days or even hours. The sign may precede all other symptoms even by years. Frenkel does not think that general paralysis should be diagnosed on the strength of the pupillary phenomenon alone. Raehlmann has attributed it to variations in the activity of the sympathetic nerves. Chaslin and Séglas have regarded the symptom as frequent in cases of mental disorder other than that associated with general paralysis; they find it to be more variable and more rapid in its alternations in the former than in the latter class of patient.

Locomotor Ataxy. Alternating mydriasis has been recognised in this disease by various authors: Nettleship and Miklaschewski have recorded instances. Frenkel here narrates the case of a tabetic in whom the phenomenon was evidently due to varying amounts of sympathetic irritation as it was accompanied by retraction of the eyelids.

Insular Sclerosis. The reported examples of the alternating mydriasis in this disease are not numerous and none are free from doubt.

Infantile Paralysis of Cerebral Origin. Only one case of the phenomenon has been recorded in association with this disease.

Chronic Cervical Myelitis. Gessner has obtained one case, and Frenkel thinks it is to be explained by excitation, varying in intensity, of the sympathetic centres in the part of the spinal cord affected.

Hydrocephalus. Wilks observed the symptom, which could be produced at will by changing the position of the head on the pillow, and explained it by variations in the intracranial pressure; Frenkel fears that inequality of illumination may have played a part in this instance.

Graefe's original case was published in 1857 in the *Archiv für Ophthalmologie.* The pupillary changes took place very rapidly and frequently, and were accompanied by disturbance of the power of accommodation, which Frenkel finds to be quite exceptional; the case stands alone, and Frenkel thinks it should not be regarded as one of true alternating mydriasis.

2. *Due to Disturbance of Function.* In these cases the explanation of true alternating mydriasis is to be sought not in implication of the sympathetic nerves by the morbid process, but in an affection, whether organic or not, which by a reflex path effects dilatation sometimes of one pupil, sometimes of the other.

Of this class in the sub-division due to organic diseases examples have been furnished by patients suffering from pleurisy, pneumonia, morbus cordis, gastritis, peritonitis, nephritis, typhoid fever, etc. In the sub-division of this class headed neuroses, true alternating mydriasis has been recorded in Graves' disease, neurasthenia and hysteria, but so great is the number of cases which have been collected that Frenkel thinks faulty methods of observation or the use of mydriatics or myotics may account for a proportion of them.

3. *In Health.* Cases of true alternating mydriasis in healthy persons have been recorded, but many are not free from doubt, and Frenkel is of opinion that more observations are needed before the existence of this phenomenon, apart from disease, can be considered to be established.

False or Experimental Alternating Mydriasis. According to Piltz there are three conditions which are capable of giving rise to this variety of symptom, viz.: (*a*) inequality in the reflex excitability to light of the two eyes; (*b*) inequality in the response of the two pupils to the accommodative reflex (*c*) inequality of the pupillary contraction in response to spasm of the orbicularis palpebrarum muscles. Frenkel suggests as a fourth cause, abolition of the reflex to light associated with an insufficiency of convergence on one side; this is really an extension of the second of the causes enumerated by Piltz. Frenkel also points out that a patient with one eye blind and its pupil fixed in a position of moderate dilatation may afford another example of false alternating mydriasis. Such a patient may present the phenomenon when the eyes are subjected to variations in the amount of illumination or in their degree of convergence.

Frenkel's conclusions are as follows:—Spontaneous or true alternating mydriasis is always of spasmodic origin, the influence being brought to bear either directly or reflexly through the cervical sympathetics. A paralytic mydriasis can hardly disappear and re-appear even on one side, much less on both sides. Cases of the true variety must be admitted in which indirect disturbance of the sympathetic function has been caused by such visceral diseases as pneumonia, pleurisy, etc., which have attacked first one side and then the other. In cases of neurosis such as hysteria and neurasthenia the symptom requires further investigation with more careful observation than it has hitherto received. As regards false alternating mydriasis, the phenomenon has a very different significance according as it is due to the pressure of an unequal degree of excitability of the two retinæ, or to pupillary disorders; these disorders may be disturbances of the response to the stimulus of light, of convergence, or of contraction of the orbicularis palpebrarum muscles. The cases of glaucoma are worthy of special observation.

The prognostic significance of alternating mydriasis can only be estimated when the cause of the symptom has been ascertained and realised in each individual case. True alternating mydriasis never exists in health, though faulty methods of observation may lead to cases being reported.

J. H. Fisher.

G. Stanculéano (Bucharest). **An Unusual Condition of the Posterior Surface of the Cornea in Interstitial Keratitis.** *Klinische Monatsblätter für Augenheilkunde*, November, 1904.

Stanculéano gives an account of the microscopical examination of two eyes with old interstitial keratitis taken from a young girl who had died of pulmonary phthisis.

The superficial epithelium of the cornea was slightly thickened: Bowman's membrane was partly retained, partly replaced by round cells. The more superficial layers of the substantia propria showed considerable cell-infiltration and numbers of newly-formed vessels. The "rare condition," however, was found in the deeper layers in the centre of each cornea, where they had broken down and formed an internal ulcer. At this point Descemet's membrane had disappeared, while the iris was united to the cornea by fine connective tissue. At the sides of the ulcer Descemet's membrane was thrown into distinct folds which projected into the anterior chamber.

There were several isolated anterior synechiæ towards the periphery, where Descemet's membrane was almost absent, although the corneal substance in front of them was healthy. No mention is made of the presence or absence of giant cells, tubercle-bacilli, or tubercle-like nodules in the cornea, as is recorded in similar cases.

To the reviewer (though not to the author) it seems most probable that the whole pathological condition, interstitial keratitis as well as internal ulcer, was of tubercular origin; if this opinion be correct, the sequence of events is not so extraordinary.

Stanculéano draws attention to the occurrence of an internal ulcer of the cornea in a case of hydrophthalmus congenitus described by v. Hippel.

THOS. SNOWBALL.

J. GALEZOWSKI. **Retinitis Punctata Albescens.** *Recueil d'Ophtalmologie*, December, 1904.

THE author (the son of a distinguished father) says that this disease was first described by Mooren in 1868: he draws a distinction between such cases as can be shown to be congenital in origin, and others which are probably not congenital. First he records two cases occurring in brothers, the elder aged 34, the younger 21. They possess a sister, aged 36, who has had no eye symptoms whatever. Their parents, who enjoy good sight, are first cousins, as were also [? one pair of] their grandparents. In both patients the condition has been noticed since first they were able to walk alone, when they certainly showed a difficulty in finding themselves, particularly if the light was dim; when this was the case they held their hands out in front to guard themselves from injury against doors and articles of furniture. In short, they acted just as one does who has severe night-blindness. The failure of vision has advanced very slowly up to the present, and it is only now that they have become incapacitated by progressive loss of sight. With the ophthalmoscope a singular change is visible about the macula in the elder brother, for at that region the colour is brownish grey, inclining towards green, evidently similar to what has been previously observed by other writers. This peculiar coloration is limited to the posterior portion of the retina and disappears towards the equator, where the fundus assumes a more normal line. The whole retina over that area is dotted with innumerable white points; these are much more numerous towards the periphery, and as one approaches the centre they become more and more scattered; in the macular region itself there was not one. In shape they are nearly all rounded, some few are oval, and at the periphery they are slightly larger in size than nearer the centre, at which region, indeed, they are so small as to be hardly visible. The dots are flat, not raising the retina at all, and there is not one trace of pigmentation. The colour of the disc is very similar to what we see in retinitis pigmentosa, and the vessels are somewhat diminished in calibre. The vitreous, the lens, and the cornea are all quite normal. Subjectively the vision is found to be $\frac{1}{2}$ in ordinary light, with a slight restriction of the field, but when the light is reduced vision rapidly becomes much feebler.

The younger brother presents a very similar appearance, but the scattering of little white dots is less copious, and there is some pigmentation at the lower part of each fundus. These pigment masses are exactly such as one sees in retinitis pigmentosa, and are situated among the white dots, but more particularly in areas in which these dots are absent. Subjectively the symptoms in the younger brother are similar to those of the elder, but his central vision is better and his field less contracted.

The symptoms are those of the typical cases of this rare form of disease—restriction of the field, diminution of central vision, and night-blindness, dating from childhood and occurring in the person of a patient some other members of whose family are also (very frequently) attacked, and whose parents in a number of cases have been cousins—but a few cases have been exceptional in one or another of these points. Thus, for example, Mooren saw a patient with this disease who had no night-blindness and no restriction of the field, though the fundus was quite typical. Faulty colour-vision has been observed in other cases. Apparently in certain of the examples too the peculiar brownish-grey tint of the fundus observed in the central area alone by Galezowski has been continuous over the whole visible fundus. A very strange fact about this disease seems to be its close relation to retinitis pigmentosa; not merely are the symptoms exactly similar, so that after examining the patient subjectively one " expects " to see pigmentary degeneration of the retina, but actually in one member of a family there may be one disease, in another the other. Even the same eye may present both conditions, as has been noted several times, in certain cases the white spots predominating, in one or two others (for example one described by de Lapersonne), there being a few white dots scattered about amid the black in a case of retinitis pigmentosa which was otherwise typical.

Although the two diseases present precisely the same symptoms, and symptoms so decided, there are certain points in which they differ, for in retinitis albescens the atrophy of the nerve and the extreme shrinking of the retinal vessels do not appear to occur, which are so prominent a feature of retinitis pigmentosa, and, perhaps in consequence, the progress of the disease is very much slower; so far, indeed, in no patient has it been seen to go into complete blindness. The posterior polar cataract, too, which is a complication of retinitis pigmentosa of far from infrequent occurrence, has not as yet occurred in the other disease. J. Galezowski suggests that perhaps the actual lesion in the two diseases is the same, but in the one case the more superficial layers of the retina, and the vessels along with them, suffer; in the other the disease tends rather to involve the parts lying towards the choroid. One has some difficulty in accepting this explanation, seeing that one important — the reviewer thinks perhaps a very important—feature of retinitis pigmentosa is the atrophy of the deep pigment layer of the retina which lies next to the choroid. Galezowski does not say whether this feature was present or not in his cases of retinitis albescens. Nor does he mention whether, as in the pigmentary cases, the dots seem to have any relation to the course of the main blood-vessels of the retina; from the fact of his suggesting that they lie near the choroid one would gather that they had no such arrangement.

W. G. S.

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zur Nedden (Bonn). **The Infective Marginal Ulcer of Cornea.**
v. Graefe's Archiv für Ophthalmologie, lix., 2.

The bacillus of the infective marginal ulcer of the cornea was described by zur Nedden in 1902, and a notice of his original paper will be found in the *Ophthalmic Review* for 1902, p. 322. In the present communication he records all the cases in which he has since found the bacillus in question, 43 in number, and reaffirms his conclusion that the bacillus is the cause of the ulcer. In twenty of the cases the lesion was purely a marginal ulcer, in the remainder complications were present, such as hypopyon, or phlyctenulæ, or diplobacillus conjunctivitis, or pneumococcus. The presence of the bacillus was demonstrated by cultures, and its pathogeneity by inoculations on the rabbit. In the rabbit's cornea a severe keratitis always resulted, proportionate to the strength of the dose. Subconjunctivally an acute infiltration resulted, and in the anterior chamber iritis with exudation, which was subsequently absorbed. The bacillus is eminently ærobic.

zur Nedden believes that the bacillus attacks the uninjured cornea, it probably is growing harmlessly on the conjunctiva for a time, and does not invade the cornea until the epithelium has been softened by the products of its growth. In the cases in which it makes its way in through an actual wound the ulceration is more severe and usually an hypopyon is formed, as in several of zur Nedden's cases. The interest attaching to these observations is at the present time purely scientific, as the therapeutics in common use are usually quite sufficient to deal with these marginal ulcers. Warm stupes, atropine, and mild " antiseptics " are the effective therapeutics.

J. B. S.

Wolffberg (Breslau). **Important Clinical Points in Perimetry.**
American Archives of Ophthalmology, xxxiii., 6.

This paper, translated from the German issue of the *Archives*, contains a good deal of interesting matter, and in view of the laxity with which questions involving the field of vision are apt to be treated, deserves some mention. The author has devoted a great deal of labour to the study of the extent of the field of vision and to the various alterations which it undergoes under different circumstances.

He makes the statement that a field of vision, if it be normal, ought not merely to have the ordinary limits in daylight, but ought to suffer no restriction whatever on reduction of the illumination so long as sufficient light remains to render the fixation spot visible. Since the amount of light varies greatly under ordinary conditions, it is well that one should check by some means of photometry the degree of illumination present when a field is plotted out, and he suggests the employment of a simple method which he has devised for his own use. He had a test card constructed with blue letters on a black ground: in bright light one can read $^6/_6$ on this card, but when the light is reduced till $^6/_6$ on the ordinary scale is just visible, the eye can only read $^5/_{30}$ on the special card. In the course of the examination of any doubtful case reduction of illumination can be regulated by means of the visibility of this card and the effect upon the field observed.

Dealing with the peculiar field of fatigue, in which if the observer, in place of being content with one circuit of the field, works round again, he finds as he returns to each meridian that the limit there is narrower than it was on the former occasion, so that the line joining the limiting points round the field traces a spiral or "watch-spring," he remarks that v. Reuss was the first to show that this "fatigue spiral" is an indication of a psychical and not merely of a retinal fatigue. This v. Reuss proved by demonstrating that if in a neurasthenic who showed this sign, the (say) left eye were kept bandaged during the prolonged testing of the right, it showed the reduced field at once on being uncovered. *A priori* one might no doubt have expected this, but it was v. Reuss who definitely demonstrated the site of the fatigue.

If we wish to make a distinction between central vision and the peripheral, where are we to draw the line? Anatomically the matter is simple enough, for the macula is the centre and all the rest is periphery, but there are certain practical difficulties which are not met by this simple division. Helmholtz and Hirschberg are both quoted as using the analogy of a sketch or picture, in which the important part is drawn carefully and the parts less vital and more remote are delineated with ever-decreasing accuracy and particularity, Hirschberg adding to this that at the central area the colours even as well as the forms are precise, fading into a gray or neutral zone at the periphery. The acuteness of central vision, Wolffberg says, "is of diagnostic value in the estimation of refraction only," which is true in a sense, "but in order to find whether the periphery of the retina has its normal function, and thus to make differential diagnoses, we determine the limits for blue, red, and green." In this way we obtain information as to the state of the photo-chemical and neuroptic apparatus, for the fields of vision are but little affected by the state of refraction. Since it is the fact that with reduction of the illumination the perception of blue diminishes more rapidly than that of red, perception of blue must depend more upon the condition of the photo-chemical apparatus, perception of red more upon that of the neuroptic. Using always the same size of test object, the same colours (in respect of spectral purity) and the same background—lustreless black cloth—and varying only the intensity of general illumination, Wolffberg finds that when the illumination is reduced to $^3/_{15}$ (on his blue-black types) there is a reduction of field, but never more than of 15° if the light sense is normal, and the typical sequence (blue, red, green) is never lost. With further diminution of illumination the fields of colour contract in similar fashion, and gradually each colour is wiped out in the same sequence—green, red, blue. In lesions of the neuroptic apparatus (*e.g.*, optic atrophy) the colour fields contract concentrically and fade away in this order, which is preserved even when the patient is examined in a reduced light. In certain forms of lesion of the neuroptic apparatus the field for white may be little altered, if at all, though the colour fields have shrunk: in certain cases the field for green shrinks first, and may all but vanish ere the red field has begun to contract, but under all circumstances the order of the fields is preserved. The author agrees with what has long been known, that if the colour fields are markedly restricted and the white field affected little or not at all, that fact indicates a diminution in the excitability of the colour-blind portion of the field, and most probably a serious advance in the disease, while large colour-fields, even with some reduction of the white field, form an indication of a more stationary process. Diminished excitability can often be made out to be true not merely of the peripheral fields in such conditions, by a relative diminution at the macula in the ability to recognise a coloured spot of small size, even when central vision is "perfect" or good. In a certain number of the cases of traumatic neurosis the abnormal fatigue has been preceded by a considerable amount of abnormal excitability. Lesion of the photo-chemical apparatus is indicated by an altered relation of the blue and the red fields; thus, for example, in idiopathic night-blindness the perception of red exceeds that of blue all over the field, provided the illumination is sufficiently reduced.

W. G. S.

R. Deutschmann (Hamburg). **Nodular Degeneration of the Cornea.** *Beiträge zur Augenheilkunde.* Heft 61.

Deutschmann records two cases of the above affection, and expresses his views upon the connection between this variety of corneal degeneration and the degeneration described as "trellised" (gitterförmig) and "spotted" or better "punctate." The readers of the *Ophthalmic Review* will find descriptions of the various opacities at page 141 of the Vol. for 1904, and at page 187 of the Vol. for 1902.

Deutschmann's views do not differ essentially from Fehr's, which put the nodular and trellised opacities in one group and the punctate in another. The principal distinction is the absence of any elevation of the surface in the punctate opacity, but all three possess so many points in common that they may be regarded as merely different types of the same affection, of whose causation and pathology we at present have no certain knowledge.

J. B. S.

A. Bourgeois (Rheins). **Traumatic Myopia from Forward Propulsion of the Lens.** *Annales d'Oculistique,* October, 1904.

Cases of traumatic myopia have been recorded by Arlt, Berlin, Dufour, Guende, Bouchart, and Darier. The author is of opinion that they are not so uncommon as the scarcity of the literature on the subject would suggest, and this is certainly the case. Probably they will be more frequently recognised now that accidental cases have acquired a greater importance medico-legally, and consequently will have to be examined with greater care. In the cases hitherto published, the traumatic myopia was temporary, but in the author's three cases the condition was permanent. The forward movement of the lens becomes possible only by stretching or tearing of the zonule of Zinn. At the same time as the lens and iris are thrown forwards the aqueous is forced backwards into the posterior chamber or circumlental space; and that space remains distended by aqueous unless the fibres of the zonule recover sufficiently, so as to be able to drag the lens back and so relieve its pressure against the iris.

Two of the author's cases were due to direct blows on the eye, the other was the result of a fall on the head. In each case there was a myopia of about 3 D, vision was reduced to about $\frac{1}{4}$ with correction, and there were symptoms of subacute glaucoma, which were relieved by pilocarpin.

J. Jameson Evans.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

The President, Mr. John Tweedy, in the Chair.

Meeting held January 26th, 1905.

Modification of Clark's Speculum.—Dr. L. Cole-Baker.

The modification in this instrument consisted in the addition of a small tube through the hinge of the speculum, through which a metal pin about an inch in length, or longer if desired, could be passed and locked in any position of extension by means of a locking screw. The end of this pin resting on the cheek supports the weight of the overhanging part of the speculum, and in addition enables it to be tilted up to any degree in order that the speculum may not press upon the globe when the lids are retracted. The aid of a skilled assistant for tilting the end of the speculum may be thus dispensed with.

Needle-holder for Straight and Curved Needles.—Dr. L. Cole-Baker.

This consisted of four rods clamped together at one end, having the ends bevelled in such a manner as to make the free ends normally stand apart. Over these four rods ran a tube one inch in length, which could be freely moved towards either the clamped ends of the rods or toward their free ends. These free ends could thus be brought close together, and where they touched each other were serrated, so that they held a needle quite firmly when closely approximated by the tube being moved downwards towards the free end. For holding curved needles, the needle is placed horizontally, having three rods on the convexity and one rod in the concavity. Straight needles are held by having two rods on either side. The movement when using curved needles is not a shoving or forcing one, but merely a rotatory one from the fingers, thus allowing greater delicacy and accuracy.

Changes at Macula and Optic Disc.—Mr. W. H. Jessop.

The left eye of this patient, an architect aged 19 years, showed a deeply excavated disc, chiefly so on the temporal side, and paleness of the nasal side. At the lower part of the disc a small vessel running towards the macula crossed the excavation, on a thin membrane. Several small vessels could be made out in the floor of the cup, and one in particular came from a small spot in the excavation and passed towards the macula. The surface of the retina, near the top of the disc, had a vitreous-like appearance. The area immediately round the yellow spot appeared raised, giving at first sight an appearance as of a detachment, but later on this had presented the appearance described as a hole in the retina. Still later this appearance became less marked, and several spots looking like cholesterine appeared. This condition of the optic disc was considered to be congenital, but the changes at the yellow spot not. The patient stated that two months before, his sight had been quite good, but one night he had severe frontal headache, and the next morning found the sight very blurred, chiefly in the left eye. He had never had a blow in the eye, was not a great smoker, and had no specific history.

Congenital Over-action of the Levator Palpebræ, with Paresis of Superior Rectus—Mr. Leslie Paton.

The patient, a girl aged 9 years, had showed defective movement of the left eye since birth, and though she had twice had diphtheria the condition was considered to be previous to that. The left palpebral aperture was wider than the right, and the left eye appeared to be set at a lower level than the right. On looking downwards the visual axes became nearly parallel, and on looking up at first this parallelism was maintained, but as the left eye began to lag somewhat behind, a sudden lifting of the left upper lid took place. The superior rectus was markedly defective in its action.

Unilateral Neuro-retinitis: Rapid Development of Star-like Changes at the Macula Lutea.—Dr. L. Werner.

The patient, an anæmic girl aged 24, stated that on getting up one morning she had noticed a mist before her left eye which had increased during the day. Ophthalmoscopically the optic disc at the upper margin had the appearance of a choked disc, being greatly swollen, blueish in colour and very vascular. The retinal veins were engorged and tortuous. The lower part of the disc was white and atrophic, with faintly striated and indistinct woolly margins, suggestive of a subsiding neuritis. The centre of the disc was filled in. A greyish-white area was present at the macula. Within three days of the first examination as given above, a perfect star of brilliant white lines was seen at the macula, such as is usually seen in albuminuric retinitis. A careful examination of the urine failed to detect the presence of albumen, and it was very doubtful whether sugar was present. Treatment with iron proved beneficial. The other eye remained quite sound.

Gunshot Injury of the Eyeball.—Mr. Secker Walker.

The patient, a stonemason aged 37 years, had been shot in the left eye on January 21st of this year. The shot had entered in the ciliary region below and passed across the interior of the eye. There had been a large prolapse of the ciliary body and iris, and the whole eyeball was filled with blood. The eye was excised, and during the operation the point of exit of the shot had been found an eighth of an inch to the outer side of the disc. A radiograph of the shot was also presented, showing the presence of two shots placed deeply in the orbit, but at the operation they could not be found. The most curious point about the case was the presence of two shots and only one opening where they entered the eyeball, and one opening where they apparently left it.

Malignant Disease of the Conjunctiva.—Dr. Freeland Fergus.

The patient, a girl aged 9 years, had been admitted in November, 1903, with a peculiar condition of the bulbar conjunctiva of the right eye. The conjunctiva was covered, especially at its lower and inner parts, with sprouting vegetations not unlike those seen in severe cases of spring catarrh, being soft to the touch, pale in colour, and covered with a frothy mucous discharge, yet no part of the limbus appeared to have been affected, nor the palpebral conjunctiva. This condition was said to have been present some six months. There was no exophthalmos, and the disease was not considered to extend into the orbit. The growth was removed and the patient returned home, in January, 1904. The vision of the eye was $^6/_9$. On March 8th of the same year the growth had reappeared, and this time both the bulbar and palpebral conjunctiva was affected, the eyeball was displaced outwards and its movements were limited ; also a mass projected forward between the eyelids. Vision at this time was $\frac{6}{60}$, no pain was present, nor were any of the glands enlarged. The report of the pathological examination of a portion of the growth, removed at this time, stated that the growth was entirely cellular, mostly spindle-shaped, with thin-walled vessels running through it, and while it was stated to be more papillomatous in general structure than anything else, still the highly cellular character made it very suspiciously like a sarcoma. Accordingly the whole contents of the orbit were removed, and the patient returned home on the 14th of April. On the 23rd of May she returned with the orbital cavity completely filled with tumour mass, and the pre-auricular gland was also involved. The patient at this time was at times very drowsy, and on the supposition that the growth extended into the cranial cavity, it was decided to leave it. The patient died on October of the same year with an enormous tumour—larger than the head itself—proceeding from the right orbit and pre-auricular region. At the *autopsy* the tumour was found to have involved the whole of the right anterior fossa of the cranial cavity. No gland enlargement was found anywhere else in the body, nor were there any metastases. The diagnosis of leucosarcoma appeared to be the only possible one.

Treatment of Corneal Ulcers with Quinine.—Mr. Arnold Lawson.

The writer considered that quinine was of the greatest benefit in the large class of corneal ulcers which refuse to heal under the ordinary lotion, atropine, and bandage treatment, such cases as not infrequently, under any form of treatment, drift from bad to worse, are very prolonged, and finally do not heal till the vision has been permanently and often very considerably impaired. It is in these cases that the quinine treatment has proved of the greatest value; many ulcers which, when first seen, have appeared most formidable from their great extent and depth, having been healed within a few days:—(*a*) Ulcers showing a large loss of surface and involving the substantia propria of the cornea, but not highly infective. (*b*) Marginal, scalloped ulcers. (*c*) All infiltrating and infective ulcerations, provided that there is little undermining of the edges and that the condition is not exceedingly acute, as shown by the rapid formation of hypopyon. (*d*) Neuropathic ulcerations, and (*e*) Marginal ring ulcers of the cornea, are the conditions of corneal ulceration which yield most readily to quinine. All superficial forms of ulceration are very amenable to this treatment, as are Phlyctenular ulcerations, but the ordinary treatment of the latter conditions is rather to be preferred, since it is conspicuously successful, and since quinine lotion and drops are not quite so soothing as boric acid lotion. Of the three salts of quinine tried: (1) Quinine Sulphate, (2) Quinine Hydrochloride, and (3) Acid Sulphate of Quinine, the two last have the advantage in that they are more soluble in water, but the ordinary sulphate of quinine appears to have been found the most efficacious. Great care is however necessary in its preparation, only just sufficient acid being used to ensure complete solution, care being taken that the resulting solution is not markedly acid. The lotion used is of the strength of gr. vi. of quinine sulphate to 1 oz. of distilled water. If the ulceration does not show any decided improvement within a week it may be concluded that the quinine is not going to prove successful. The writer has found that with no other form of treatment is the resultant cicatrix, when the substantia propria has been involved, so translucent as after treatment by quinine. A table showing the result of quinine treatment in 37 cases of ulceration of the cornea was also appended, showing good results as well as failures—which latter appeared to be very few.

Notation of Prisms.—Mr. C. Worth.

The purpose of this paper was to ask the Society to make some pronouncement on the notation of prisms, so as to remove the inconvenience caused by the present confusion. In ordering a spherical or cylindrical lens one specified for a definite effect produced upon a pencil of light, but in ordering a prism the optician usually took it that the order was intended for a number of degrees according to the geometrical angle, but as was well known the deflecting power of the prism varied considerably according to the kind of glass used. A lens was exhibited made of German glass, and another of the same strength made by the same tool, and with the same radius of curvature, made by an American firm; both of ostensibly 13 dioptres. It was found, however, that one was actually (that is neutralized by) 12 dioptres, and the other by 15·5 dioptres.

Two Unusual Cases of Detachment of the Retina.—Mr. D. J. Wood (Cape Town).

In vol. xii. of the *Transactions of the Society* (p. 143), Dr. Wood reported a case of detachment of the retina with a very unusual dilatation and tortuosity of the retinal vessels. The case now dealt with is said to be very similar: two rounded detachments of the retina meeting below and widening out above; vitreous clear. The swelling and tortuosity of the vessels was marked, the vessels being more than double their proper size, and tortuous to a degree, evidently owing to the numerous constrictions which occurred at varying distances along their course. The bands causing the constrictions were apparently of retinal origin, and in many places gave rise to the appearance which would be produced by stitching a vessel down to the retina. The arteries and veins were very similar in colour, so that it was difficult to make out which was one or the other. The margin of the disc was visible, and was the only landmark in the confusion of twisted vessels, white patches of exudation, and semi-detached retina. No recent hæmorrhages were to be seen. The similarity of the two cases at once gave rise to the idea of a common cause, either a proliferation of inflammatory tissue, or a primary disease of the vessels, and it was held to be quite conceivable that the serum from the obstructed vessels caused detachment of the retina, but that did not account for the remarkable lightness in colour of both veins and arteries, unless caused by a mixture of blood between the two.

REGINALD E. BICKERTON.

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TUMOUR OF THE CEREBRAL HEMISPHERE WITH HEMIANOPSIA.

By JOHN WHARTON, B.A., M.B., B.C. (Cambridge),
Senior House Surgeon, Royal Eye Hospital, Manchester.

M.M., a girl aged 23 years, was admitted as an inpatient to the Manchester Royal Eye Hospital under the care of Dr. Hill Griffith, on March 14th, 1904. The history of the case was that for three years she had suffered from intense headaches, and that during the last six months there had been attacks of vomiting almost every morning.

The patient stated that the first attack of vomiting followed a fit. (The description of the fit, by the girl's parents, did not indicate any local lesion). During the illness she had lost a little flesh.

The mother, sisters and brothers had always enjoyed good health, but the father had been attending Dr. Hill Griffith's out-patient department for two years with primary optic atrophy. There was no history of tuberculosis or syphilis in the family.

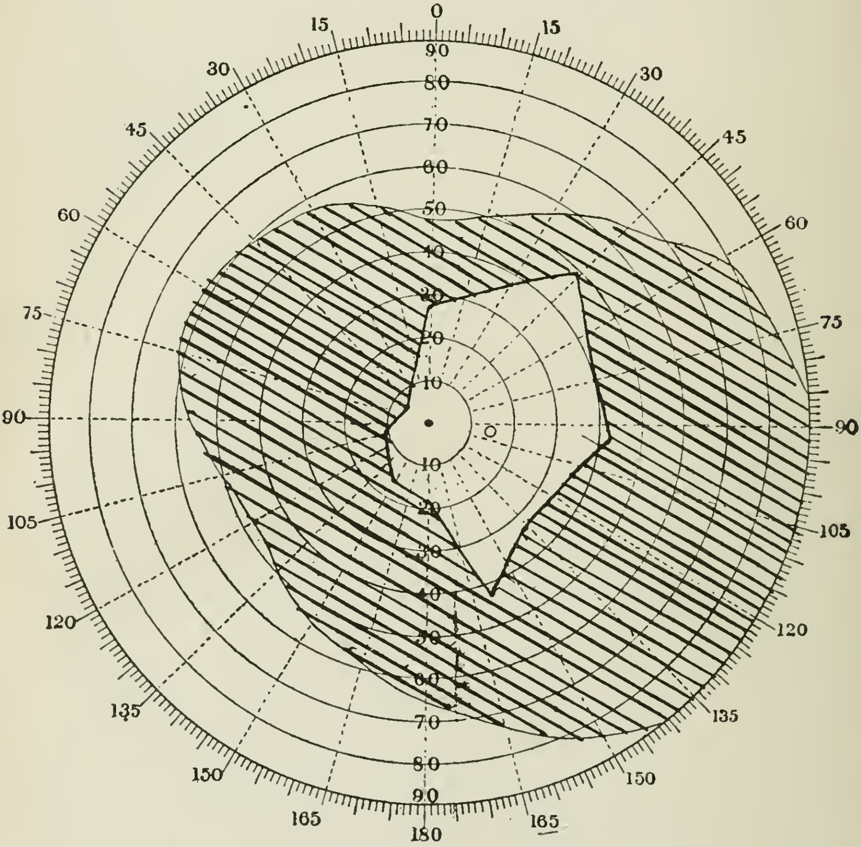
On admission the patient's condition was as follows. She looked ill, was anæmic and inclined to drowsiness. The ocular movements were good and the pupils reacted to light and accommodation. There was a high degree of optic neuritis (right and left), with markedly engorged retinal vessels, and a few small hæmorrhages on the swollen discs. The vision was: —

R $\frac{6}{18}$ and J 6. + 2 D Sph = $\frac{6}{18}$ and J.
L $\frac{6}{24}$ and J 4. + 1 D = $\frac{6}{18}$ and J.

There was no astigmatism, and a skiascopy under homatropine gave 1·25 D. Sph.

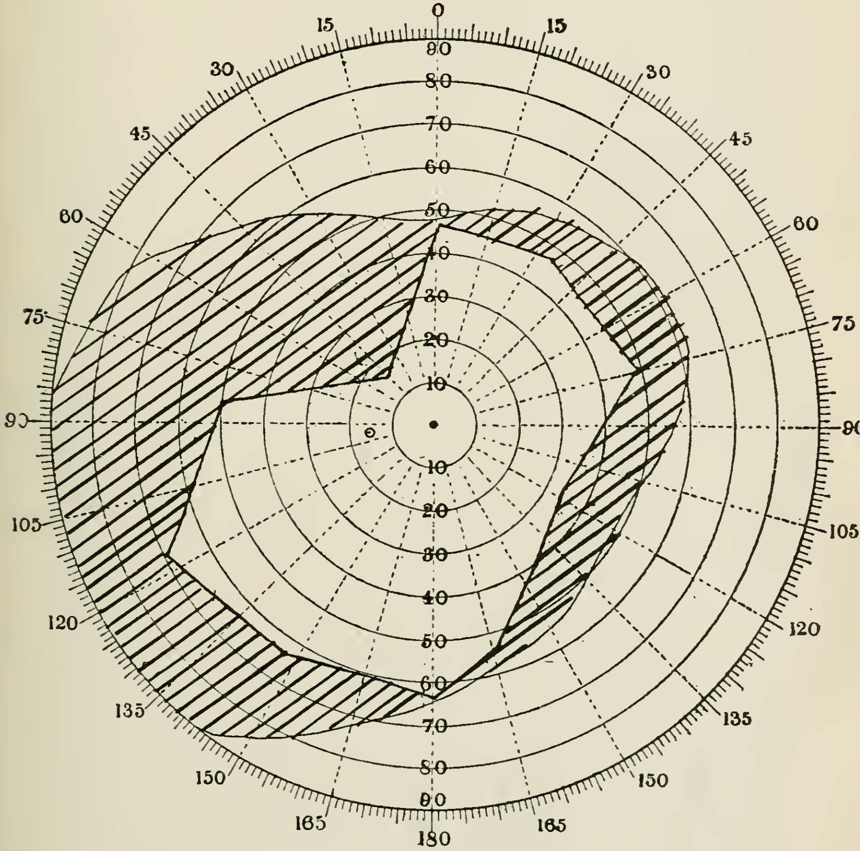
At the time of admission the patient was suffering from severe headache, which was not local, and there was no tenderness or percussion of the cranial vault. The heart and lungs were found to be normal, and a careful examination of the nervous system failed to discover any anæsthesia, hyperæsthesia, paresis or paralysis.

RIGHT.



From the headache, vomiting and optic neuritis, the case was considered to be cerebral tumour, but its approximate situation was not made out until a field of vision was taken, when an incomplete left hemianopsia was found. In addition there was contraction of the fields, especially of the right.

LEFT.



From March 14th to 28th, the patient had intense headache, with frequent attacks of vomiting, sometimes as many as six severe attacks of the latter during 24 hours. On March 28th the vision was:—

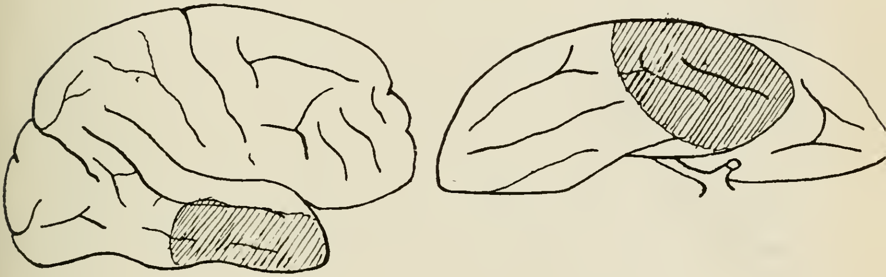
R $\frac{6}{60}$ and J 12 + 2 D = $\frac{6}{24}$ and J 4.

L $\frac{6}{12}$ and J 4 + 0·5 D Sph = $\frac{6}{12}$ and J 4.

The optic neuritis was now more intense, and in addition there were large numbers of retinal hæmorrhages in each eye, especially in the right. The hemianopsia was also more pronounced though not complete. During April 2nd the patient had most severe attacks of vomiting and she died on April 3rd.

From the time of admission up to her death repeated general examinations were made, but without any new factor being discovered. The presence of the incomplete left hemianopsia with active pupils and the optic neuritis, headache, and vomiting pointed to the existence of a neoplasm behind the corpora quadrigemina and somewhere in the right cerebral hemisphere.

Post-mortem Examination. There was considerable wasting of the body, but nothing pathological was to be found in the trunk or limbs. On removal of the cranial vault the meninges were found quite normal. There was no evident increase in cerebro-spinal fluid. After removal of the brain an examination of the same showed a perfectly normal left hemisphere. The anterior two-thirds of the lower two temporal convolutions and the corresponding portion of the occipito-temporal convolution on the tentorial surface presented a soft, gelatinous appearance, with surface limits fairly well defined. The membranes over the external area of the softened mass were quite normal in every respect. Several sections of the brain tissue showed that this soft mass extended inwards from the surfaces above mentioned, and passing backwards involved the lower portion of the right internal capsule chiefly at its posterior extremity; the lower border of the lenticular nucleus was infiltrated with the growth. The optic thalamus was quite normal. The growth was entirely devoid of capsule, and no cystic formations or hæmorrhages were discovered.



The shaded areas indicate the surface limits of the tumour.

A microscopical examination of the tumour showed it to be a glioma, and its extension along the tracts above stated proved by microscopical sections of the various parts. The corpora quadrigemia and optic nerves were examined microscopically and found perfectly normal. A microscopical section of the whole globe showed intense optic neuritis with numerous hæmorrhages on the disc and retina.

I have to thank Dr. Hill Griffith for his kindness in permitting me to publish the above case.

REVIEWS.

ELSCHNIG (Vienna). **Detachment of the Vitreous.** *Klinische Monatsblätter für Augenheilkunde*, December, 1904.

ELSCHNIG reviews Iwanoff's theory of the causative relation between detachment of the vitreous and detachment of the retina, in myopic eyes, and, as the result of his pathological investigations, arrives at conclusions opposed to Iwanoff's well-known views on the subject.

After hardening and cutting with special care and precautions Elschnig examined seventeen eyes with myopia of from 2D to 30D, and five eyes with a typically situated posterior staphyloma or with coloboma of the optic nerve. In only four of these specimens was the vitreous found separated from the posterior retina, and the space behind it filled with fluid. Even in these four instances careful examination revealed that small masses of vitreous remained everywhere attached to the retina. In all the other specimens the relations of the vitreous were normal. Elschnig therefore agrees with Arlt's findings in myopic eyes. He disagrees with Iwanoff's view that in high myopia detachment of the vitreous is common, and consequently with the theory that such detachment is the usual precursor of detachment of the retina.

Elschnig enforces his argument by the observation that in cases of detachment of the retina in myopic eyes followed by cyclitis, one frequently finds the vitreous liquefied at the centre but remaining in contact with the retina peripherally. He adds instances of funnel-shaped detachment of the vitreous found after traumatisms followed by irido-cyclitis, in which no detachment of the retina existed.

At the conclusion of his paper Elschnig makes an observation which, though only having an indirect bearing on the subject of the paper, is of interest. From the clinical and pathological examination of a case well known for ten years in the eye clinics of Vienna, and which had been demonstrated as a case of retinitis pigmentosa with persistent hyaloid artery, he suggests that the appearance so described, not infrequently seen in eyes affected by choroidal disease, where a greyish, semi-translucent, delicate funnel projects from the neighbourhood of the disc into the vitreous where it is lost, is neither a remnant of a hyaloid artery nor a fibrous tissue band, but is really a funnel-shaped detachment of the vitreous.

W. W. SINCLAIR.

H. VILLARD (Montpellier). **Alterations of the Cornea in Acquired Syphilis.** *Annales d'Oculistique*, October, 1904.

THE occurrences of changes in the cornea in acquired syphilis has been denied by Hutchinson, Graefe and others, but at the present time the reality of such changes has been definitely established. They may appear as:—

1. Interstitial keratitis: (*A*) diffuse, (*B*) localised.
2. Primary punctiform keratitis.
3. A form of gummatous keratitis, the existence of which is as yet rather doubtful.

1*A*. *Diffuse interstitial keratitis* occurs in adults, generally between the ages of 20 and 50 years. It is more common in women than in men (8:3). Its onset is not definitely related to defective general health or to the existence of any particular diathesis, *e.g.*, gouty or scrofulous. It is generally considered to be a tertiary manifestation. The time of its onset varies from five months to eight years after the primary infection. Cases in which the primary sore appears on the eye or its adnexa are not more liable to this form of keratitis than are those in which the primary sore is situated elsewhere. As a rule it attacks one eye, in contradistinction to the interstitial keratitis of hereditary syphilis. The keratitis of acquired syphilis comes on insidiously, and the opacity is slight as a rule.

The inflammation passes through the stages of infiltration, vascularisation and absorption. The stage of infiltration is characterised by the appearance, either at the periphery or in the centre, of small opaque masses which soon run together and occupy the whole cornea. The infiltration is in the corneal tissue proper, but is more abundant in the deeper layers. The anterior epithelium is generally intact, but it presents the dull, unpolished appearance which is observed in all forms of parenchymatous keratitis. Vascularisation of this infiltrated tissue takes place much sooner, but is much more limited, than in that of hereditary syphilis. It also differs from the latter in that it is much more easily and favourably influenced by energetic antisyphilitic treatment. Absorption follows insensibly on the vascularisation, and as a rule is so complete that the eye regains its normal state. The subjective symptoms are little marked, visual acuteness is greatly reduced when the infiltration is at its height. Photophobia, blepharospasm, lachrymation and pain are minimal in degree. Iritis may be present, but it is never very acute. The course of a case of keratitis of acquired syphilitis is much shorter in duration than that of hereditary syphilis. The average duration of the former, under vigorous treatment, is from five weeks to three months. The prognosis is also much more favourable, as the cornea becomes absolutely normal, and relapses are very exceptional. The etiological diagnosis is arrived at through the history and the presence of other signs of acquired syphilis. The age of the patient, the comparative mildness of the symptoms, the absence of relapses and the amenability to treatment distinguish it from the hereditary form.

Treatment should be early, active, and prolonged. Locally: iced compresses, vapour douches and atropine; later: massage with yellow ointment. In severe cases subconjunctival injections of solutions of cyanide or perchloride of mercury (1:2000 to 1:1000) may be employed. As general remedies, mercury, iodides, and tonics should be given. The mercury should be administered by inunction or by subcutaneous, intramuscular or intravenous injection. The iodide should be given in rapidly-increasing doses. Tonics are meant to counteract the depressing effects of iodide and mercury.

1*B*. *Localised keratitis* in acquired syphilis [also called partial interstitial keratitis and circumscribed interstitial keratitis (Panas)]. This form is much more uncommon than the diffuse keratitis. It affects adult patients of 30 to 50 years of age. It attacks women more frequently than men. It is generally unilateral and characterised by a more or less triangular greyish-white infiltration having its base at the periphery and its apex near the centre of the cornea. This patch becomes slowly vascularised, and this is followed by a stage of resolution which is of much longer duration than that in the diffuse form. Contrary to what is generally observed in the diffuse variety, partial keratitis is always accompanied by violent ocular reaction, with photophobia, lachrymation, and often with very intense pains which yield with difficulty to general and local sedatives. Though localised keratitis may be a solitary sign, it is generally accompanied by marked iritis which constitutes one of the chief clinical features, thus contrasting strongly with the condition in diffuse keratitis. This iritis is often particularly intense and intractable, and may become complicated with choroiditis. The co-existence of an inflammation of the iris and ciliary body gives this form of keratitis its peculiar clinical characteristic. According to Alexander and Nagel it is a species of trophic corneal trouble produced by a degenerative neuritis of the ciliary nerves which are attacked by the inflammation of the iris and ciliary body. The prognosis is serious, and almost always worse than that of the diffuse form, because the course of the disease is much less influenced by treatment. The treatment should be the same as described for diffuse keratitis, but giving particular attention to the concomitant iritis (atropine in ointment or in watery or oily solution, leeches to temple or mastoid, purgatives, subconjunctival injections of mercurial solutions, local and general sedatives, etc.).

2. *Primary punctiform keratitis*, also called kératite pointillée, k. punctiforme (Hock) k. punctata (Manthner). This condition is very rare and develops in the secondary or tertiary stage. It is characterised by the appearance in the deeper layers of the cornea of greyish sand-like clots, of the size of a pin's head or less, clearly defined one from the other and recalling the appearance of small grains of semolina. These punctate opacities are peculiar in that they appear and disappear with remarkable rapidity. The circumcorneal injection is slight, and the symptoms of reaction are reduced to a minimum, and although the eye may be very tender to touch, spontaneous pains are generally very slight.

Primary punctiform keratitis runs its course, almost always, without any inflammation of the iris and ciliary body, and thus it is easily distinguished from the keratitis punctata which is so often associated with serous iritis and which is a common secondary symptom of inflammation of the uveal tract. Moreover the deposits, in the latter case, are situated on Descemet's membrane and not in the tissue of the cornea. The prognosis in primary punctiform keratitis is generally serious. It is generally of long duration, and it may leave small permanent leucomata which, if central, greatly interfere with vision. The treatment is the same as for the diffuse form.

3. Gummata of the cornea have been described by Magin

1863), Galezowski (1878), Gayet (1883), Lang (1886), and Peters (1898). Notwithstanding these authorities, the existence of corneal gummata should be accepted with the greatest reserve. According to Denarie, who described Gayet's case, the gummata are almost always situated in the posterior layers of the cornea. There appears in that region an infiltration, more or less extensive, presenting in its centre an opaque spot formed by a plastic deposit which is whitish or greyish-white and simulating an abscess. This corneal lesion may be preceded and accompanied by a subacute inflammation showing itself by a little photophobia, lachrymation, and some dull orbital or circumorbital pains. There is very little reaction in the iris. The diagnosis seems problematical to the author. Interstitial keratitis, and especially abscess of the cornea, are the conditions with which it would be most easily confounded. The prognosis seems to be very grave, but a little less serious in cases where an early diagnosis has been made and an energetic antisyphilitic treatment adopted.

J. JAMESON EVANS.

FELIX LAGRANGE (Bordeaux). **Treatment of Myopia by Extraction of the Transparent Crystalline Lens. Late Results.** *Annales d'Oculistique*, October, 1904.

LAGRANGE is impressed with the value of the operative treatment of high myopia, and is convinced that it has not, in France at all events, been given the place it deserves among therapeutical measures. He gives the results of twenty cases, in which he needled the lens and extracted by a linear incision. Visual acuteness was increased in all cases, sometimes two- or three-fold. This improvement he describes entirely to physical causes and not to any improvement in the nutrition of the eye. The total diminution in refraction varied from 19 D to 25 D. These variations are considered to be due to inaccuracy in the estimation of the myopia before operation, the refraction appearing greater the further the correcting lens is held from the eye. The average reduction may be taken as 20 D. Although the patients operated upon suffered from pernicious myopia, in no case were the lesions in the fundus aggravated by the operation, and detachment of the retina was never observed. The influence of the operative treatment on the evolution of the myopia was decidedly beneficial. Not even in the case of young subjects was there any increase in the length of the globe after operation. This salutary effect is ascribed to the suppression of accommodation and the abolition of binocular vision, and consequently of convergence, which result from extraction of the lens in one eye. With two exceptions only one eye was operated on, and this is recommended by the author as the best procedure.

J. Jameson Evans.

E. Franke and E. Delbanco (Hamburg). **Our Knowledge of Tumours of the Optic Nerve and its Sheath.** *v. Graefe's Archiv für Ophthalmologie*, lix., 3.

The history of the case from which the specimen to be described was obtained is as follows:—

The patient, a woman, aged 37, had a gradually increasing proptosis for 10 years. After parturition the proptosis became more marked, so that the tumour causing it had to be be removed by Krönlein's method. Two—three—four years after the operation there had been no recurrence; on the contrary, there was slight enophthalmos. The general health of the patient had always been good.

Macroscopic examination. The tumour, the size of a plum, had the optic nerve protruding at its anterior end, posteriorly the tumour filled the apex of the orbit. In parts the tumour was covered by a fibrous capsule, in other parts it passed into orbital tissue without capsule. A transverse section through the centre of the tumour shows the optic nerve lying about the middle, surrounded by apparently normal neural sheath; round this sheath the tumour spreads in all directions permeated by thicker connective tissue-like fibres which pass into the neural sheath. *Microscopic sections* show the optic nerve tissue to be either wholly or in great part displaced by tumour tissue. The tumour is of similar character in optic nerve, nerve, sheath and orbital tissue and is made up of cellular and connective tissue elements. The extra- and intradural parts of the tumour show an alveolar construction which is formed by the connective tissue elements, and a rich capillary network separating the cell masses. The cell masses are concentrically arranged. A small sickle-shaped portion of the optic nerve is still intact. As stained by van Gieson's method the optic nerve sheath is brown-red in contrast to the wine-red of the tumour connective tissue. The meshes of optic nerve sheath are filled with tumour cells. The tumour in parts shows small concretions. The author considers the growth to be a fibro-endotheliomatous new formation and to be identical in appearance with a psammoma.

On account of the malignancy of tumours arising outside the optic nerve sheath and the characters of the growth under consideration the author concludes the origin is in the nerve sheath, but whether arising from dura, pia or arachnoid cannot be distinguished in specimens obtained.

The author discusses the Pacchionian bodies and the origin of psammomata and sarcomata of the dura mater, and though the data are not exactly applicable to the optic nerve and its sheath, he nevertheless concludes that the origin of the tumour is in the arachmoid.

H. Horsman McNabb.

De Berardinis (Naples). **Streptothrix causing Corneal Ulcer.** *Annali di Ottalmologia*, xxxiii., 12.

While making a systematic study of the bacteriological origin of hypopyon ulcer, De Berardinis, who previously described a case, reviewed in this Journal, in which the colon bacillus was the morbus peccans, now describes two typical traumatic corneal ulcers with hypopyon, in which examination showed the presence of streptothrix—a hitherto undescribed cause of this affection. The first case was a mild one, and resulted in healing and formation of a leucoma; but in the second panophthalmitis developed, resulting in the loss of the eye. Clinically, there was nothing marked in the course of the cases to distinguish them from those arising from the commoner bacterial organisms described as giving rise to such conditions. In both cases cultures inoculated into the conjunctival sac of rabbits only produced a conjunctivitis when the conjunctiva and cornea were uninjured, but after scarification of the corneal epithelium typical hypopyon ulcer was developed. The streptothrix found in the second case, when panophthalmitis developed, were of a more virulent nature than those found in the first case. De Berardinis believes that streptothrix may in the future be found to be a frequent cause of corneal ulcer, and that their presence has in the past been overlooked owing to their losing readily their typical branched appearance in unsuitable media as well as in old cultures, and so giving rise, by splitting and fission of their branched filaments, to an appearance like diplococci, and that it is only in a suitable medium like blood-serum that the filamentous and true morphological nature of the streptothrix is brought out.

THOMSON HENDERSON.

V. MORAX. **Annular Abscess of the Cornea.** *Annales d'Oculistique*, December, 1904.

MORAX describes a case of pneumococcic infection, the point of entrance of which was probably the lungs, followed by general septicæmic symptoms, an endocarditis and metastatic infection of both eyes. The right eye presented a clinical picture of annular abscess of the cornea, the left eye showing only a moderate degree of irido-cyclitis. The right eye was removed three days before death with the view of relieving general symptoms.

The *autopsy* showed a large vegetation on the mitral valve, cultures from which gave pure pneumococcus. Sections of the embedded eye showed the centre of cornea infiltrated by polymorphonuclear leucocytes, the infiltration being most marked in the superficial layers. Peripherally the infiltration was more marked, fusiform masses of cells between lamina occupying the whole thickness of the cornea, but stopping short of its extreme edge, so that there was a narrow ring of clear cornea. The cornea was free from microbic infection. The other points noted were:—A polymorphonuclear leucocytic exudate blocking the filtrating angle, infiltration of iris, ciliary body and rest of uvea, retina and vitreous. Pneumococci were found in all these.

In discussing the endogenous nature of the case, Morax explains the amicrobic condition of the cornea on the lines laid down by Fuchs, viz., that the corneal condition results from the products of the micro-organisms found in the anterior chamber, just as we have microbe-free hypopyon in cases of infected corneal ulcers. Hanke's idea that these cases of annular abscess are due to a special microbe is not favourably entertained by Morax.

H. C. MOONEY.

Dianoux (Nantes). **Glaucoma and Sclerotomy.** *Annales d'Oculistique*, February, 1905.

This article is intended as a reply to one by Abadie, published in *La Clinique Ophtalmologique*, who in that journal and in a paper read before the Ophthalmological Congress at Lucerne has laid down the proposition that sclerotomy is quite powerless to cure glaucoma, and has invited any of its partisans to produce evidence of a good result from its employment lasting for a period even so short as a few weeks. As an upholder of sclerotomy, Dianoux takes up the gauntlet: formerly he used to perform sclerotomy and iridectomy, but for the last twenty-four years he has discarded iridectomy altogether in favour of the other, whether in chronic glaucoma or in the acute form. He considers that perhaps the enigma of an operation condemned by some as futile and trusted in by others may be capable of solution when one compares the methods of performance employed. One must know precisely what each means by the term sclerotomy, for under this expression some seem to mean an operation which Dianoux regards as little more than a mere paracentesis. Such being the case, he thinks it well to describe the operation which he performs. After the pupil has been thoroughly contracted by means of eserine and drops of cocain and adrenalin applied, a puncture is made with Graefe's knife immediately in front of the root of the iris; the counter-puncture is similarly situated, and the distance between them is equal to about one-third of the cornea. The best situation for the puncture and counter-puncture is fairly well indicated by the engorged vessels coming from Schlemm's canal. Slight rotatory movements are then made of the knife about its long axis in order to allow of the escape of the aqueous humour; the contraction of the pupil which occurs coincidently is watched. The wounds of puncture and counter-puncture are then enlarged to about 3 mm. The next or fourth step is somewhat delicate; the point of the knife is drawn back into the aqueous chamber and is then caused to mark out a furrow or trench in the angle of cornea and iris up to the wound of entrance; the knife is then withdrawn. In performing this operation it is necessary that the true sclerotic should be incised, and in order to make sure of this the point of the knife should be visible emerging from the sclera under the conjunctiva. This is, in fact, the operation which both

Dianoux and Abadie learnt from De Wecker, and the difference between the methods of these two surgeons lies mostly in the after-treatment. With the procedure as thus described Abadie considers the operation, such as it is, completed, but Dianoux is of opinion that the vital element in the treatment comes after. By means of the procedure described the best possible relief to the closed angle is gained which can be attained to with a view to continued filtration, but even though there may be but little likelihood of a very precise closure of the wound in exactly its old relations, yet one cannot look for the formation thus of a permanent safety valve; one can hardly hope for anything, unless one proceeds further, than a gradual return of the old impermeability sooner or later, and should this occur the benefit of the operation must necessarily be merely temporary. It is here that Dianoux in his mode of procedure diverges from Abadie and others, for he regards the operation as merely the first step in the treatment, as merely affording the needed facilities for the further procedure, namely, massage and the employment of miotics. Even within twelve hours after his operation the dressing is removed and massage begun, this having the effect of partially re-opening the wounds (if the anterior chamber has re-formed), and of causing the aqueous to escape from the chamber into the spaces under the conjunctiva. This process of re-opening the wounds and expelling the contents of the anterior chamber may be repeated at intervals for four or five days, and concurrently a collyrium is employed of eserine, pilocarpine and cocain, and, in recent days, adrenalin. On the seventh day as a rule the patient may go home with directions to continue those drops persistently, and Dianoux feels that if he can induce the patient to comprehend that by persistence in the treatment two or three times a day he can do a good deal to establish better relations between outflow and influx, if, in short, he can get him interested in the mechanics of his own case and induced to persevere with the treatment, not only will the sight which he possesses be conserved, but his vision and his field will increase during several months following the operation. Even if one fails to rouse the patient to so much activity in his own interests, the fact of the wound having been kept for a week from sound healing gives some little guarantee that the scar will be such as to admit of considerable filtration.

As Dianoux very truly (in the opinion of the reviewer) says, whatever theory of glaucoma one adopts, and there is truth mixed up with error in them all, one is obliged in the end to come back to arterio-sclerosis, or rather perhaps to the condition of nutrition which leads to arterio-sclerosis, as lying at the root of glaucoma; but just as one may live a long time with his arteries somewhat sclerosed, so an eye may be a useful organ for many a day even when, in consequence of this arterio-sclerosis, it has become "glaucomatous," provided that by some means or other one prevents those degenerative changes occurring which are so apt to follow upon a rise of tension. The utmost one can do is only to bring back the tension to its normal height, but even that is a great deal, and it is obvious that no operation can "cure" arterio-sclerosis. Miotics are all very well in their way, but they certainly of themselves, and even in combination with massage, are incapable of curing glaucoma, and when once the field of vision is invaded and the tension is kept above normal an operation is definitely required.

The author here makes a statement with which all will not agree, for he says: Je n'ai jamais encore observé de glaucome chronique où cette élévation de tension ait manqué et je ne connais pas l'atrophie avec excavation. Avec un peu de doigté, on le décèle toujours.

Into his further remarks upon the rival merits of sclerotomy as he conducts it, on the one hand, and of iridectomy on the other, it is hardly needful to follow Dianoux: it is sufficient to say that he is convinced of the superiority of the former, whether the glaucoma be acute or not.

W. G. S.

CZERMAK (Prague). **Ophthalmic Operations.** Vienna: Karl Gerold's Sohn, 1893—1904.

THE writer of this treatise has, we imagine, established a record for a one-author book. The first part appeared in 1893, the last in the latter part of 1904! Such undue delay in completion must necessarily detract from the reputation and restrict the circulation of any treatise on a scientific subject, and has before now led to the complete failure of books.

In medicine, perhaps as much as in any of the allied sciences, a book which is eleven years old is ready for revision; hence in such a work as that now before us, a new edition of the earlier sections is wanted, in order that the whole volume may be up to date. With these remarks, which may perchance be borne in mind by future authors, we pass to a brief notice of Czermak's *magnum opus.*

The volume extends to 1,222 pages, and is the most exhaustive work on the subject which has hitherto appeared. It is clearly and nicely written, though in parts, the author might have rendered his meaning equally intelligible, if not more so, in fewer words. The illustrations, which, on the whole, merit consideration, are scarcely as numerous or as well chosen as might be expected. It would, we think, have enhanced the attractiveness of the book if, instead of the numerous illustrations of instruments and apparatus (with which all ophthalmic surgeons are familiar), many more diagrams of operative procedures had been inserted in the text. Descriptions of operations unfamiliar to the reader are made much more easily intelligible by even the simplest of diagrams. Pictures of knives, scissors, forceps, etc., can always be seen in instrument makers' catalogues.

After a detailed account of instruments, apparatus, methods of insuring asepsis, and the preparation of the patient, Czermak begins the real subject of his treatise with "Operations on the Eyelids, Conjunctiva and Lacrimal Passages." This part is done very fully, and includes *inter alia* a large number of operations for deformities of eyelids, congenital and acquired, and all the operative treatment of trachoma and its results. The next section treats of operations on the orbit and the ocular muscles, and is interesting and valuable, in that the operative treatment of diseases of the orbital tissues is dealt with more fully than is usually done in works on ophthalmic surgery. Following this is a very inclusive heading, "Operations on the Eyeball"; beginning with cornea and taking up in order the sclera, iris, lens, vitreous and retina. Under this heading is included the removal of foreign bodies from the different parts of the globe.

A good index and list of authors completes a work of which, in spite of the regrettable delay in publication, the author may well feel proud, and one which cannot fail to be of value to every ophthalmic surgeon.

JACOBY (Breslau). **The Neuroglia of the Optic Nerve.** *Klinische Monatsblätter für Augenheilkunde*, February, 1905.

THE paper deals chiefly with the arrangement of the neuroglia in the neighbourhood of the disc. The writer comments on the uncertainties attending the various methods of staining the neuroglia. He is unable to explain the failures, and does not consider his modification of the Weigert stain more certain than other methods. With regard to the general structure of the neuroglia he adopts the views of Weigert, considering the neuroglial fibres to be distinct from the cells and not merely cell processes. In its development the neuroglial fibre is no doubt a secretion of the cell, but, like the connective tissue fibre, it subsequently becomes independent of the cell. At the level of the lamina cribosa the neuroglial fibres are thicker than elsewhere, doubtless to aid in sustaining the intra-ocular pressure. At the level of the disc the limiting tissue, "Grenzgewebe," of Elschnig, is seen to contain many neuroglial elements. The neuroglial fibres in the optic disc are very fine. After the nerve fibres have bent round into the plane of the retina the neuroglial fibres will be found mostly perpendicular to the course of the nerve fibres. The intermediate tissue described by Kuhnt as placed between the choroidal ring and retina is shown to be a collection of neuroglial fibres concentrically arranged. Jacoby is inclined to think that this ring of neuroglia may be seen by the ophthalmoscope as a narrow bright stripe surrounding the nerve entrance. This is not, however, the connective tissue ring described by Elschnig. In pathological conditions, such as choked disc, Dr. Jacoby considers that this glial ring becomes greatly thickened. On the floor of the physiological excavation in normal eyes he found neuroglial elements mingling with the connective tissue elements, the remains of the arteria hyaloidea. The paper is illustrated by a series of fine drawings of the microscopical appearances of the neuroglia in the region of the lamina cribrosa and optic disc.

J. V. PATERSON.

Van Duyse (Ghent). **Bilateral Hemianopsia after a Gunshot Injury.** *Archives d'Ophtalmologie*, January, 1905.

The clinical notes of this case may possess some value even if, as Van Duyse somewhat quaintly remarks, to the great advantage of the patient, the present record of his case has not been completed by a *post-mortem* examination.

In the course of a conflict between gamekeepers and some poachers on the night of Sunday, 8th December, 1901, a young man of 22, one of the latter, received a shot in the right temporal region. He fell at once, and remained lying deserted by his comrades for some time whose exact duration is unknown. When he recovered consciousness he was quite blind, and after many failures it took him three hours at last to reach his own house, distant a little over a mile. There he lay from early on Monday morning till the following Wednesday without receiving any medical attendance, when he was taken by his father to the University Clinique.

The young man, of strong physique, was there found to be entirely blind; but the pupils, which were of medium size, acted to light, though sluggishly; no changes were to be found with the ophthalmoscope. There was absolutely no motor or sensory localising symptom to assist one in the diagnosis. (At first his replies to questions were slow and delayed, but presently it was found that this was due less to the injury than to the circumstances under which it was received, and that the tardiness of his replies was occasioned merely by a dread of the authorities and not by the nature of the trauma, medically speaking.) A wound was found 4·5 c.m. above the auditory meatus on the right side, and 1 c.m. posterior to it; into this the surgeon introduced a probe for a distance of 12 c.m., the direction of the track being almost precisely horizontally into the cranial cavity; it was found that the size of the projectile was about that of a large pea. A radiogram showed the presence of a foreign body lying close to the left temporal region, 2·5 c.m. above and 2·5 c.m. behind the left auditory meatus, which position it was thought to have reached by ricochet and in virtue of its own weight. The evening temperature was slightly raised, and there was some headache. On the 13th December the pupils were less dilated, and reacted better to light, and the patient began to perceive objects; this he could do best over the inferior part of the field of vision. At first he required also to touch an object before he could properly recognise it, but very shortly he could tell the two sides of a coin if it was placed in the central portion of the field of vision. By the time he quitted hospital in the end of December his dics were healthy and his visual acuteness $^1/_3$, and long after that it went on slowly improving, until eventually two years later the acuteness of central vision was normal.

Certain singular features were presented in the field of vision:—(1) The left upper quadrant of each field was lost except at the very periphery in the field of the left eye, where there was a marginal zone of retained vision. The lines of demarcation of this quadrantic scotoma were sharp; the lower limit in the right field was on the horizontal plane, in the left field it was parallel to this, but about 3° above it. (2) Macular vision was intact, and the macular fields were similar. Each had the form of an egg, and the most part was below the horizontal plane; though similar, they were not absolutely identical. (3) Each macular field was surrounded by an absolute scotoma, irregular in form but symmetrical, including in its area the blind spot; there was in fact a partial bilateral hemianopsia with conservation of the macular fields. Even over the retained portions of the lateral fields there was a large part in which vision, though not lost, was very imperfect; this was more marked for the left eye than for the right; in process of months, however, these portions of the fields to a considerable extent recovered their activity. During 1902 and 1903 the patient had a number of attacks in which vision, even in the retained portions of the fields, was almost completely lost; these attacks lasted about half an hour, and were believed to be due to spasm of the vessels supplying the visual portion of the cortex. They were accompanied by a sensation of flickering in the field of vision, by nausea, vomiting and headache,—a central transient amaurosis in fact.

In regard to the skiagrams which were taken more than once, there was considerable difficulty of interpretation; for, although there was only one aperture of entrance, yet when the left side of the head was applied to the plate the shadows of two bodies were seen. One of these was rounded and sharp, and indicated the situation of the projectile lying on the opposite (left) side of the head to the wound of entrance (right). The other was more oval and less distinct, and pointed to the presence of "something" on the right side of the head. When the plate was on the right side of the head the relative sharpness of the two images was reversed. It is possible either that two masses of lead entered by one aperture or that the pellet had split into two parts after entering. The study of certain cadavers has convinced van Duyse that a lesion of the skull in the same position as in the patient would be apt to involve also the anterior portion of the optic raditions behind the lenticular nucleus of the internal capsule. In this region are the fibres connected with the corpus geniculatum exterius and the pulvinar, and with the occipital lobe. It is very important in this connection to note that the patient's pupil acted when light was thrown even upon the totally blind portion of the retina.

In this case the fact that the patient was at first quite blind, and that vision was at least partially recovered in certain regions of the field, is entirely in accordance with what has frequently been observed; it may be the effect of a cerebral contusion, of hæmorrhage into the third ventricle, and of numerous other lesions. The author looks upon this case as one of incomplete bilateral hemianopsia, with retention of the macular field; the curious point that the macular field is spared has been true in all the cases so far published of bilateral hemianopsia. It is indeed rather difficult to see how this condition could be diagnosed during life unless the central vision were spared. Van Duyse seems to regard the opinion of the duplication of the macular fibres as the correct explanation, but discusses the others briefly; among other matters he points out that the extra and peculiar vascular supply to the macular region of the cortex required by one theory would not be sufficient to explain the facts unless one postulate also extra nourishment of the macular fibres in the optic radiations.

One interesting point about the patient in connection with these questions was the repeated occurrence of transitory complete blindness, amaurosis fugax, with scintillating scotoma and subjective light sensations; these photopsiæ are said to be a feature of lesions of the optic radiations. The author attributes these attacks to temporary ischæmia from spasmodic contraction of the vessels of the cortical area of vision.

We regret that from considerations of space we have not been able to do more than give a mere barren outline of a very interesting but lengthy paper. W. G. S.

GRIMSDALE (London). **The Chief Operations of Ophthalmic Surgery.** *Medical Times, Ltd.*, London, 1904.

MR. GRIMSDALE has produced a little book which is intended to enable the student to learn something at least of the method of operating so far as verbal directions to be carried out upon the eyes of "muttons, beeves or goats"—or pigs, for choice,—can teach him. It does not profess to include all the known methods of operation upon the eye, nor is it desirable that such a book should, as the author says in his preface. The selection is, of course, under the circumstances, somewhat arbitrary, and in fact the book deals with the operations of ophthalmic surgery as performed by Mr. Grimsdale. For example, he says (p. 117), "Both in iridectomy for glaucoma and in cataract extraction a large piece [of the iris] should be excised," neglecting the fact that some of the best operators who employ the "combined" method make only a small coloboma in extraction and that this plan has great advantages over the other; nor does he mention that the iris hook may with great benefit be substituted for the forceps. The question of modes of operation in glaucoma is so thorny that a writer must be either dogmatic or diffuse. Mr. Grimsdale has wisely (in our opinion) chosen to be the former, although we do not commit ourselves as agreeing with him. The author is not always quite happy when he leaves the subject of operations and discusses other points such as suppuration after extraction, which, indeed, are not within the scope of the book as outlined in the preface, and are dealt with so imperfectly that they had better have been omitted altogether. It is fair to say that he does not often err in this way.

The diagrams are painfully crude; it is well that they should be simple, but they could hardly have been less elegant. The description of each operation is careful and the directions well laid down, so that a student need have no difficulty in following them. In this the author has been decidedly successful, even if in some instances the recommendations themselves are open to criticism. We notice that under the head of excision of the lachrymal sac he twice says that this "means permanent lachrymation"; such has not been the experience of the reviewer. He does not in the list of instruments required for use at this operation mention Axenfeld's very valuable spring hooks.

We would suggest that in the event of another edition being required the name of the actual operation under consideration should be made much more prominent than it is, and that the paper and the type should be improved.

CLINICAL NOTES.

The Treatment of Senile Ectropion.—Some eight years ago Terson described a mode of operation of which he still thinks very highly, and which he again brings forward in an article in *Annales d'Oculistique;* it has recently been brought to notice also, but in a somewhat modified form, by de Obarrio. First the swollen pad of conjunctiva has to be excised from one commissure to the other, the section being carried posterior to the punctum. The part to be removed is always quite easily recognised by its surface, which is velvety, does not glisten, and is red, in contrast to the smooth, glistening, pink conjunctiva. In performing this step it is not well to interfere with the *cul-de-sac*, nor to approach too closely to the lid margin. One must also also avoid injury to the cartilage. Stitches are not required, and it is better not to insert any; the outer commissure must be left intact. Then a small equilateral triangle of skin has to be removed from just beyond (5–6 m.m. from) the outer canthus, its base nearest to the eye and standing as much above as below the line of the palpebral aperture: the raw surface is covered by drawing the skin margins from within outwards, inserting five or six sutures so that the resulting wound may form a line with a concavity or bend in the middle towards the eye.

In making the raw surface the purpose to be served ought to be clearly borne in mind; it is not to drag upon one lid, but by altering the action of the sphincter (which in presence of ectropion has the effect of increasing the fault) to convert its evil effect into a normal one. It is sufficient as a rule to apply cocain, with or without adrenalin, but it is not wise to inject it subcutaneously, as the relative position of parts is thereby altered, and one's results are therefore rendered a little uncertain; if necessary it is better to administer a general anæsthetic. Terson slits the canaliculus beforehand, and regards this matter as very important. The operation is well suited for senile ectropion, but ought not to be used for cases of paralytic or of cicatricial ectropion.—*Annales d'Oculistique*, November, 1904.

Trachoma.—In our issue of January, 1904, we gave a review of Boldt's book on this subject; this most important malady is discussed from every side therein with much care and success. We desire here merely to draw the attention of those interested to the fact that the book has now been translated into English (by Mr. Parsons and Mr. Snowball), and published by Hodder and Stoughton, and that it thus becomes a more ready book for consultation at the hands of a larger number. The translation is agreeably done, and a preface is inserted, written by Mr. Collins.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

The President, Mr. John Tweedy, in the Chair.

Meeting held February 9th, 1905.

Cases.

Myeloid Sarcoma of Orbit.—Mr. Flemming and Mr. J. H. Parsons.

Two Cases of Removal of Fragments of Glass from the Interior of the Eye.—Mr. J. H. Fisher.

Case i. The patient, a young man aged 17, was struck in the right eye by a fragment of broken glass from the bursting of an electric lamp while he was in the act of cleaning. The fragment penetrated the right eyeball behind the ciliary region on the nasal side, and attempts at its removal had only succeeded in driving it completely into the vitreous cavity out of reach from the outside through the original wound. With the ophthalmoscope the piece could be seen lying transversely behind the lower part of the lens. The patient was put under chloroform and the wound enlarged sufficiently to admit of the manipulation of a pair of forceps within it. In the darkened theatre, and with the aid of the ophthalmoscope, the operator was enabled to guide the forceps, seize the fragment and withdraw it. The fragment, after its removal, measured $\frac{1}{2}$ an inch by $^{1}/_{12}$th, and was rectangular in shape. After the operation the wound was closed by means of conjunctival sutures. When examined later the eye had settled down with some opacity in the vitreous, a detachment of the retina, and some scarring of the fundus in the lower periphery. The detachment gradually subsided, together with much of the opacity in the vitreous, the field improved, and at the end of two months the vision was, with correction, $^{6}/_{18}$ and Jg. 4.

Case ii. The patient, a young man aged 15, had injured his left eye

17 days before admission into the hospital, by a piece of a chemical flask which had burst while boiling. The eye was not injected, but there was a small oblique scar in the lower part of the cornea towards the nasal side; the anterior chamber was normal in depth. The tension of the eye was normal, the lens was in process of becoming opaque, and the lower half of the pupillary margin of the iris adherent to the lens capsule, while a small fragment of glass could be seen lying on the front of the iris below.

The next day this piece was removed by means of forceps through an incision in the cornea, and fourteen days later the patient left the hospital with the eye practically quiet. This was in February. In the following August, the eye having long been in a quiet state, a further sharp-pointed angular piece of glass was seen cutting its way through the lower part of the iris from behind, and a third smaller piece was seen lying in the lowest part of the anterior chamber in front of the iris. The patient was put under chloroform and these two pieces were successfully removed through an incision made in the outer part of the cornea. No unfavourable reaction followed, and the wound healed with the iris perfectly free of the cornea. In September the eye was examined with X.-rays, and a fourth piece of glass was found to be still within the eye, situated behind, or in the back part of, the opaque remains of the lens occupying the pupil. This piece was embedded in the lens, could not be seen, and since it was considered to be in a "harmless" position, it was thought advisable to leave it alone. The eye with dilated pupil had vision of $^6/_{18}$ with correcting lenses, but with the pupil not under a mydriatic less than $^6/_{60}$.

Aseptic Slab for Ophthalmic Use.—Mr. R. E. Hanson.

This white porcelaine slab, square in shape, was provided with two deep cups for the reception of fluid applications, such as nitrate of silver solution; three small holes for the purpose of holding, in an upright position, spuds or other instruments; and grooves along the three sides for the reception of glass rods, etc., lying in them; and by depressions in the slab, room was provided on each side of the rod to enable it to be picked up by the middle and so to avoid touching either end.

Orbital Tumour.—Mr. F. Richardson Cross.

This patient, a man aged about 45, had marked proptosis of the left eye, which had been gradually increasing for some months. There had been a history of injury some time previously. Once or twice while the eye was being examined the whole eyeball became dislocated forwards between the lids.

(Functional) Absence of the Internal and External Recti Muscles.— Mr. N. Bishop Harman.

The patient, a girl aged 16 years, showed a slight divergent squint of about 5° with the left eye, whose vision was only $^6/_{60}$. Different deviations were present when the eye attempted to follow an object held (1) in the horizontal plane; (2) in some position above the horizontal plane; and (3) in a position below the horizontal plane. If the object were in the horizontal plane the eyeball was strongly retracted and deviated inwards about 20°, the lids fall in on the sunken globe, and the palpebral fissure became narrowed. The lids did not follow the globe normally owing to their being loose and flaccid, and the lower lid being separated from the globe by a fairly deep sulcus; (2) if the object were above the horizontal plane the globe became retracted and diverted upwards and inwards, and a similar narrowing of the palpebral fissure became evident; (3) if the object were below the horizontal plane the globe became retracted and diverted downwards, and the globe was drawn away from the lower lid. Frequent repetition of these movements caused pain and nausea. On directing external deviation the eye in most cases remained stationary. The narrowing of the palpebral fissure was no doubt merely caused by the passive falling in of the lids on retraction of the globe. The other movements of the globe on attempted deviation were supposed to be the result of the conjoined action of the superior and inferior recti muscles. This condition might be caused by (1) absence of the muscles; (2) by faulty insertion of the same; (3) by abnormally developed check-ligaments rendering their contraction ineffective. The writer favoured the second of these as being the most probable explanation, and this, moreover, he stated to be the only one upheld on a reference to comparative anatomy. It was pointed out that faulty insertion was of frequent occurrence in the lower vertebrates—herrings having the internal rectus normally inserted into the globe close beside the optic nerve instead of close to the corneal margin. In man, also, cases have been reported of faulty insertion; in some the muscle has been represented by chiefly fibrous tissue inserted very far back. Bietti has pointed out that this abnormality is more frequently found in the left eye.

Notes on a Case of Large Orbital Exostosis removed by Operation; with specimen.—Mr. Edgar Stevenson.

The patient, a woman aged 22, had been first seen at the Liverpool Eye and Ear Infirmary in November of last year, suffering from neuralgic pains in and round the left orbit, and slight, but increasing, prominence of the left eyeball. The eye was proptosed downwards and outwards, and she was unable to close the lids completely; the vision of the eye was normal; she was not troubled with diplopia; and the movements of the globe were perfectly free, while the ophthalmoscope showed nothing abnormal in the fundus. There was a history of a slight blow on the left eye two years previously, otherwise nothing in her history had any bearing on this trouble. Under an anæsthetic a small, hard mass, protruding from below the upper and outer margin of the orbit could be felt. An exploratory incision was made and the growth reached, but it was found to extend right across the roof of the orbit and to be attached to the base of the frontal sinus. Drilling was first attempted but failed, then chiselling was resorted to, during which the operator noticed a certain amount of "shake" in the growth, and this gave him the idea that the attachment was not quite so firm as it appeared to be. This proved to be the case, since, on seizing the mass with a pair of bone forceps it was easily wrenched away from its attachment, and removed from the orbit. The posterior half of a very much enlarged sinus proved to be its site of attachment; the tumour itself was irregularly pear-shaped, composed of cancellous bone with a hard outer shell, weighed 351 grains, and measured $1\frac{1}{2}$ inches by $1^3/_8$ths by $^7/_8$ths. The writer drew attention to the comparatively short time during which the patient had been under observation (three weeks), whereas most of the recorded cases ran on from two to four years, and frequently ended in perforation of the orbital plate. The patient made an uninterrupted recovery, and the vision and ophthalmoscopic appearances remained normal.

Case of Ivory Exostosis of the Orbit.—Mr. A. Ogilvy.

The patient, a young man aged 24, attended the Bristol Eye Dispensary, complaining of epiphora of his right eye. At first sight this was thought to be due to a mucocele, as he had a slight swelling in this situation, but later examination led to the opinion that the swelling was either an osteo-sarcoma or an exostosis; the absence of any signs of inflammation, however, excluded the probability of the former. The only sign was the displacement of the right eye some 3 mm. outwards; there was neither pain, exophthalmos, nor diplopia. The vision was good, and with the ophthalmoscope a peculiar vertical striation of the choroid was found on the nasal side; this increased while the case was under observation. There was no history of injury, and his general history was good, as was also his family history. An attempt at removal having been decided upon, a skin incision was made from the eyebrow downwards in a semi-circular direction down to the lowest part of the orbit on the inner side, severing all the soft parts and the internal tarsal ligament, the flap being then turned back over the eye. The tumour appeared sessile, but showed a groove between it and the inner wall of the orbit. One or two nodules were with much labour broken off from the tumour, but the mass itself did not appear to move until a gouge had been driven in between it and the inner wall of the orbit, and by this means it was loosened sufficiently to enable the operator to drag the whole mass away with great difficulty but without injury to the wall of the orbit itself. The wound was sutured, and an uninterrupted recovery resulted. After the operation the patient complained of diplopia due to apparently complete paralysis of all the recti muscles, but this in time disappeared until it only became noticeable when the patient looked very far to either side; the eye, which before the operation had been myopic, returned to its normal shape with full distance and reading vision. The exostosis measured antero-posteriorly 1¾ inches, transversely 1 inch, and vertically 1 inch.

The Treatment of Tobacco Amblyopia.—Mr. C. Wray.

Two cases of cured toxic amblyopia were shown. The writer pointed out that toxic amblyopia was, as a rule, present with tachycardia, though tachycardia might exist as the only symptom, and that in these cases, when it is absent, it is just as important to prevent its development as to prevent, if possible, future attacks of amblyopia. In discussing the manner in which tobacco acts as a poison, it was stated that microscopic examination showed degeneration of the papillo-macular neurons, which is most important since nicotine is frequently used in the physiological laboratory to paralyse "ganglion cells," and also is very soluble in water. Tobacco amblyopia is, as a rule, associated with toxic breath; pipe smoking is almost always the cause of it, cigarette smoking possibly never caused it, and yet cigarette smoking is the most common cause of tachycardia. Toxic amblyopia in all probability implied saturation of the blood with the poison, while tachycardia is most probably caused by the action of the smoke on the pulmonary endings of the cardio-inhibitory apparatus. The writer considered that carious teeth were a distinct element in the process of absorption of the poison, since most of the patients who fall a victim to tobacco amblyopia have bad teeth. The treatment found most satisfactory was based on (*a*) the condition of the retinal neurons; (*b*) the fact that nicotine is used in the physiological laboratory to paralyse "ganglion cells"; (*c*) that nicotine is soluble in water; (*d*) that it is eliminated by the kidneys, lungs and skin. The patient accordingly is instructed to take a pint of warm water at 7 a.m., to get up and walk briskly in the open air for half an hour; he then takes a second pint of water and walks as before for another half-hour, then rests a few minutes and has breakfast. At 11-30 a.m., 4 p.m., and 9 p.m., he takes another pint, and is encouraged to spend as much time as possible in the open air. The internal administration of iodide of potassium as a diuretic was also recommended. In one case treated by water alone the vision improved in sixteen days from $^6/_{36}$ to four letters of $^6/_6$.

CASE I. November 11 $^6/_{18}$, November 25 $^6/_5$, taking water all the time; December 9 stopped water and smoked $\frac{1}{2}$oz. a day for fourteen days, and on January 11 vision $^6/_{18}$ some, again improved to $^6/_5$ (3 letters) on February 11, smoking $\frac{1}{4}$oz. a day the whole of this latter part of the treatment.

CASE II. January 12, vision $^6/_{36}$ one letter, January 14 $^6/_{24}$, January 17 $^6/_{18}$, January 27 $^6/_6$ (four letters); this patient was on the water treatment alone without any drugs, and he smoked $\frac{1}{4}$ oz. a day of "shag" during the whole time.

Nero-fibroma of the Eyeball and its Appendages.—Mr. E. Treacher Collins and Mr. Rayner Batten.

The clinical history of the case was given by Mr. Rayner Batten. The patient, a girl aged 14 years, had been under observation for some three years. The right eye was buphthalmic to a marked degree, with very large cornea and deep anterior chamber, the cornea was also slightly hazy, suggesting interstitial keratitis, and there was some protrusion of the uveal pigment over the lower margin of the iris; vision was $^1/_{60}$; tension was normal. In addition there was marked hypertrophy of the right upper lid and skin covering the orbit; also over the temporal fossa was a large doughy swelling covered by thick, coarse skin. The condition had been noticed at birth. Some two years ago a portion of the hypertrophied palpebral conjunctiva was excised. In July of last year, since the eyeball had become unsightly, painful, and very irritable, it was excised, together with a wedge-shaped portion of the upper lid.

Pathological report by Mr. Treacher Collins. The wedge-shaped piece of upper eyelid removed was much thickened, and showed on its cut surface several thick greyish-white cords in section. Microscopically, the papillæ of the skin and of the conjunctiva were found to be greatly enlarged, with extensive hypertrophy of the fibrous tissue of the corium, and in the vicinity of the Meibomian glands were areas of dense, round-celled, inflammatory infiltration, with some multi-nucleated giant cells. In the subcutaneous tissue, which like the corium was much thickened, many nerves were seen with extensive thickening of their endo- and perineurium. The eyeball showed a large and globular cornea, 15mm. lateral and 14mm. certical diameters. Extending into the upper and outer margins were several opaque, narrow lines, which became smaller as they approached the centre. The anterior chamber was deep, and the iris showed well-marked ectropion uveæ. The optic nerve was normal, but the ciliary nerves external to the globe were somewhat thicker than normal and convoluted. The substantia propria of the cornea showed linear tracks of elongated cells, most probably thickened nerve fibres, no spaces of Fontana could be found, and it was difficult to identify the canal of Schlemm. The choroid was abnormally dense and thickened, with few blood-vessels, it was mainly composed of fibrous tissue, and in some parts contained numerous small oval bodies in the centre of which were masses of delicate convoluted fibres: these probably represented nerve-end organs. The sclerotic was thinner than usual, and in it were seen the ciliary nerves slightly thickened. Mr. Collins pointed out that molluscum fibrosum had been demonstrated to be caused by fibromatosis of the terminal filaments of the cutaneous nerves; the condition known as congenital elephantiasis, in addition to showing marked hyperplasia of the skin, also showed overgrowth of the fibrous tissue of the cutaneous nerves; and frequently associated with these two conditions, some thickening of the nerve trunks had been found. This had accordingly been named plexiform neuroma; he considered that all these conditions could be described by the term neuro-fibromatosis. The buphthalmic condition of the eyeball was undoubtedly secondary to an increase of tension, brought about by the malformation at the angle of the anterior chamber, *i.e.*, absence of spaces of Fontana, absence of the canal of Schlemm, and by a broad adhesion of the iris to the posterior surface of the cornea, the structures probably never having been properly separated during fœtal life. The retina had never in any case showed signs of neuro-fibromatosis, owing to the fact of its being completely derived from the neural epiblast (with the exception of its blood-vessels), whereas neuro-fibromatosis was essentially a hyperplasia of tissue derived from the mesoblast.

REGINALD E. BICKERTON.

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KERATITIS DISCIFORMIS, WITH THE REPORT OF A CASE.*

By Wm. Campbell Posey, M.D., Philadelphia.

J.P., a Polish mine labourer, came to my clinic at the Wills Eye Hospital, on the 10th of November of this year, upon account of poor sight. He said that his left eye had been struck by a piece of coal about six months previously, and that the inflammation which followed had persisted for some time, notwithstanding active treatment by Dr. George Halberstadt, of Pottsville. About one month after the injury to the left eye, the right eye became inflamed also. He attributed this to particles of dust getting into his eye, and to irritation provoked by splashes of sulphur water, to which he was subjected by the nature of his labour. The inflammation in this eye was never very severe, but was attended with considerable disturbance of vision. He received no treatment for this, other than the employment of some of the drops which had been prescribed by Dr. Halberstadt for the fellow eye. The patient was 40 years of age, of large and robust build, with an excellent personal and family history.

The appearance of the eyes at the time of examination was very similar to the figures illustrating keratitis disciformis in Fuchs's "Text-book on Diseases of the Eye" (page 199 of the 9th German edition). As may be seen by the sketch which was made by my assistant, Dr. W. C. Swindells, the pupillary areas of both corneæ were the seat of grayish-white opacities of a somewhat oval form, which were sharply defined from the clear corneal tissue surrounding it, by a grayish border which was rather denser than the rest of the opacity. Under the magnification of a corneal loupe, the epithelium over the opacity was found to be roughened but unbroken, and the opacities which extended posteriorly into the substantia propria resolved themselves into a number of small grayish dots. The centre of the opacity was rather denser than the surrounding area. The eyes were perfectly quiet and there was no trace of vessels either upon the opacities or at the limbus of the cornea. The opacity in the left eye was more irregular than in the right, and in its lower outer portion possessed more of the appearance of an ordinary corneal macula. Upon questioning the patient, it was elicited that Dr. Halberstadt had cauterized this eye upon one occasion, and it was thought that this atypical appearance of the opacity was due to scar tissue. With the pupils dilated with atropine, vision in the right eye equalled $^{5}/_{15}$ and in the left $^{5}/_{60}$.

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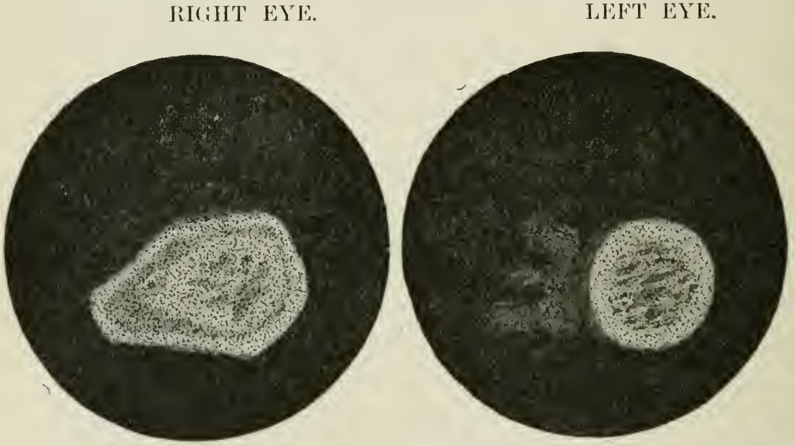
* Read before the Ophthalmological Section of the College of Physicians of Philadelphia, January 16th, 1905.



RIGHT EYE. LEFT EYE.

Although the appearance of the opacities was such that treatment with a view to their absorption seemed futile, nevertheless the patient was admitted to the Hospital and endeavours made to improve vision, with sub-conjunctival saline injections, with local applications of a 5 per cent. solution of iodine, and with massage with the yellow oxide of mercury. Unfortunately, the patient soon tired of the confinement of hospital life and eloped two weeks after admission, before sufficient time had elapsed to ascertain whether the treatment would have been productive of any beneficial results.

This is the first case of keratitis disciformis which has come to my attention, and as it has been but a short time since this form of disease was enrolled in the list of inflammations of the cornea, it may not be amiss to review what is known of it. In 1901, Fuchs, in the *Klinische Monatsblätter für Augenheilkunde*, 39, 1901–2, referred to the rather rare series of cases of keratitis parenchymatosa which had been described by Vossius,[1] in 1885, under the name of keratitis annularis, and agreed with this author in his description and classification of this variety of keratitis. He took exception, however, to the inclusion by Pfister[2] and Grunert[3] of a number of other cases of keratitis under the same category, as he stated that while these bore a certain resemblance to cases of keratitis annularis, they were really instances of a quite different form of disease, of which he himself had seen a number of examples and to which he proposed to give the name of keratitis disciformis. He pointed out that this disease was known to the older clinicians as abscessus siccus, and that they considered it to be related to ulcus serpens, the difference between the two processes being, that in abscessus siccus the quantity of pus between the layers of the cornea is not sufficient to

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1. Berliner Klin. Wochenschrift, No. 1885, 43 and 44.
2. Klinische Monatsblätter für Augenheilkunde, 1890, p. 114.
3. Klinische Monatsblätter für Augenheilkunde, Beilageheft zum 38 Jahrgang, p. 10.

break through and form an abscess, but dries up and forms a persistent corneal opacity.

According to Fuchs, the chief characteristic of keratitis disciformis consists in the formation of a round, or oval, disc-like area of opacity which invades the central zone of the cornea, beneath the epithelial and sub-epithelial tissues. The opacity is defined from the corneal tissue surrounding it, which is clear and unaffected, by a sharply cut margin, which is grayer and darker than the rest of the opaque area. The centre of the opacity is also somewhat denser than the area about it. The surface of the cornea over the opacity is dull and insensitive; at times it is roughened by the presence of small vesicular thickenings of the epithelium, while in exceptional cases the epithelium breaks down and small ulcers form. As a rule, there are but few signs of irritation; the process is chronic, and persists from 6 weeks to 3 or 4 months. leaving central opacities and much diminished vision, Fuchs has never seen perforation, but involvement of the uveal tract is not rare, and iritis with posterior synechiæ and descemetitis and hypopyon have been noted in a number of cases. The disease occurs in middle life, and usually follows a loss in substance in the corneal epithelium, which may result either from traumatism or from herpes.

Keratitis disciformis is catalogued by Fuchs midway between ulcus serpens and the flat disc-like ulceration which follows herpes of the cornea. He thinks that all three depend upon infection of the cornea, as a consequence of loss in the epithelium, and differ only in the depth to which the corneal tissue is involved and the amount of tissue which is lost, both of these conditions being dependent upon the varied action of the bacteria originating the process. According to Fuchs's theory, the corneal disease is of ectogenic infection, the central gray spot being regarded as the point of entrance of the bacteria, and the sharply defined border zone as the ring of infiltration. Von Hippel, on the other hand, who has studied a number of cases of this form of keratitis by staining with fluorescine, is of the opinion that the process is endogenic, and arises from a change in the endothelial cells lining tbe anterior chamber.

Quite recently Peters has discussed the question of the pathology, and after emphasizing the connection between this form of keratitis, corneal erosions, and ulcus serpens, has concluded that all three are dependent upon a nervous lesion affecting the corneal epithelium, as a result of which an œdema of the corneal tissue occurs, whereby the epithelium is stripped up in some cases, while in others the deeper tissues of the cornea are involved by infiltration. As thus far there has been no microscopical study made of an eye the seat of keratitis disciformis, the pathology of the affection must still be regarded as being in doubt.

Therapeusis is unavailing, and Fuchs found atropine, hot compresses, sub-conjunctival sublimate injections, paracentesis of the anterior chamber, the application of absolute alcohol to the surface of the cornea, all powerless to check the process. The galvano-cautery was of service in shortening the disease where there was a central ulcer, but upon account of the resultant scar tissue, this author advises that this should only be employed in cases where a dense scar is inevitable without the application of the cautery. He warns, too, against the too early massaging of the eye with yellow salve, upon account of the liability of exciting fresh irritation.

REVIEWS.

E. Forsmark (Stockholm). **The Muscular Tissue of the Human Iris: Its Structure and Development.** Jena: Gustav Fischer, 1905.

The author of this monograph, which covers a hundred octavo pages, is Assistant Surgeon in the Clinic of Professor Widmark. In the first portion he describes in detail the successive steps by which our present knowledge of the iris muscles has been gained; in the second he gives an account of his own recent investigations of the subject. An outline only can be given here.

Variations in the size of the pupil were explained by assuming the presence of muscular tissue in the iris by writers of the 17th century, and in the first half of the 18th the sphincter of the iris was clearly recognised. The existence of a dilator muscle remained uncertain till a much later date. Henle, in 1866, was the first to declare, from microscopical examination, that the membrane which lies immediately in front of the pigment epithelium, already described by Bruch, is of muscular nature, and acts as a dilator of the pupil. The nature of this membrane and its behaviour during different conditions of the pupil then became the subject of many investigations. Special importance was attached to the question of its containing nuclei, these being considered an essential characteristic of muscular tissue.

Fuchs, in 1885, showed that during dilatation of the pupil the several layers of the iris are all thrown into folds with the exception of the membrane of Bruch, and declared that contraction of this membrane is the cause of the dilatation. Moreover, seeing that when the sphincter is paralysed by a lesion of the 3rd nerve, atropine is able to induce further dilatation, he argued that the contraction is of an active kind and not a mere elastic recoil. Langley and Anderson, in 1892, also von Heese, showed that the iris contains a pupil-dilating tissue capable of excitation by electricity, and in the following year Retzius discovered, in the eye of the rabbit, a nerve-plexus on the anterior surface of Bruch's membrane. These observations favoured the idea that Bruch's membrane is a muscular structure. On the other hand, the complete, or nearly complete, absence of nuclei from the membrane led many writers to reject this idea.

Further advance was rendered possible by the discovery of a method of bleaching the uveal pigment, first employed by Griffith and Juler. The pigment epithelium coating the hinder surface of the iris was then proved to consist of two distinct layers, and the cells of the anterior layer were found to be closely connected with, and sometimes inseparable from, the fibres of Bruch's membrane. Thereupon the supposed development of this membrane from mesoblastic tissue became more than doubtful. Finally, Grynfeltt, and after him Heerfordt, in 1900, proved that the membrane is formed of fibres derived from the epithelial cells in question. It was shown that these cells are at first cylindrical or cuboid, and contain nuclei at or near their centres, and that later the anterior part of each cell is differentiated by the outgrowth of a contractile fibre, while the nucleus and the pigment are displaced towards the posterior end. The fibres blend to form the membrane of Bruch, and the undifferentiated remnants of the cells, with their pigment and nuclei, remain attached to them. Together they form the dilator muscle of the iris, which is, therefore, an epithelial structure.

The sphincter of the pupil appears to have been first described by Maunoir, but only as to its position and form. Koelliker, in 1848, described it microscopically as being made of spindle cells, each with a single nucleus, like those of other unstriped muscular tissue. Until quite lately the sphincter, like the dilator muscle, was supposed to be developed from the mesoblast. Nussbaum, in 1899, showed that it originates, like the dilator, in the anterior layer of the pigment epithelium at the back of the iris, and that fact was fully confirmed two years later by Szili. These researches showed that the sphincter originates from the anterior epithelial layer at the point where this is folded backwards at the pupil margin to become the posterior layer. It appears first as a group of nuclei which soon extends in the direction towards the ciliary border of the iris, its cells assuming the spindle shape and remaining for a time closely connected with the anterior epithelium. About the fifth month, in the human fœtus, connective tissue from the iris stroma begins to insert itself between the sphincter and the epithelium, from the outer side, and a month later the muscle is divided by septa of connective tissue into two or three parts. At birth the sphincter still lies to a large extent upon the epithelium and remains united with it at the pupil margin. Sphincter and dilator therefore are both epithelial structures springing from the same layer of cells. They are connected with each other by numerous fibres of the same nature as themselves.

Forsmark's own work comprised the microscopical examination of the human iris in a large number of cases, viz., from the adult eye at different ages in 10 cases, from children in 7 cases, and from the fœtus in 21 cases; also of portions of the human iris removed in iridectomy operations; also of the iris of the calf. For the methods of preparation employed, and for the details of his results, which are given at great length and are well illustrated by drawings, the reader is referred to the original paper. The following is a summary:—

1. The dilator muscle consists chiefly of a single layer of epithelial muscle cells, as described by Heerfordt. Besides these, however, it usually contains a relatively small number of ordinary unstriped muscle cells. These latter are to be found, as a rule, only at the inner and outer borders of the muscular layer, but in certain irides have a much greater extent and form thickened radiating ridges on the membranes. Since a dilator muscle consisting only of ordinary muscle cells has apparently no existence, the descriptions of such a muscle given by some observers have probably been based on the exceptional condition here described.

2. The occurrence of the two cell forms follows a definite rule; the cells which lie immediately in contact with the epithelium on the back of the iris are always of the epithelial variety, whereas those which are separated from it either by the presence of several layers instead of a single one, or by their extending into the stroma of the iris, have as a rule the mesodermal form. This rule applies even to the several parts of the same cells, so that cells may be found which in one-half present the epithelial and in the other the mesodermal type!

3. The epithelial dilator cells are united directly with each other, whilst the mesodermal, at least in places where they considerably thicken the muscle layer, are enclosed in sheaths of connective tissue.

4. With regard to the finer structure of the cells, it is to be noted that the myoglia fibrils described by Benda are found not only at the periphery but in the contractile substance itself.

Similar fibrils surround the undifferentiated portion of the cell, and seeing that this portion bulges backwards during contraction of the dilator muscle, it is improbable that they are actively contractile.

5. The dilator is connected with the sphincter by connective tissue which, through its own structure and through the presence of many thick-walled vessels, has considerable strength. The two muscles are further united by numerous fine radial or tangential muscle cells respectively belonging to, and acting with, the dilator and the sphincter.

6. The dilator muscle is developed from the sixth to the ninth month of fœtal life from the anterior layer of epithelium of the back of the iris, in the manner already described. Fusion of the cells does not occur, but their limits become less sharply defined.

7. The sphincter muscle is developed chiefly from the same epithelial layer as the foregoing, but also to a small extent, at the pupil margin, from the posterior layer. Its development takes place from the fourth to the ninth fœtal month. Its bundles are laid down separately from the beginning; the epithelium at the point in question becomes thickened and gives rise to bundles of muscle cells which grow obliquely forward and unite with similar bundles in corresponding zones. The growth of the sphincter takes place chiefly at its outer edge by the progressive formation of fresh bundles. The numerous connections existing at first between the epithelium and the sphincter diminish later, and leave only the fine circular fibres which connect the sphincter with the dilator. The outer bundles of the sphincter are formed after the development of the dilator has already begun, and remain more or less surrounded by the fibres of the latter. Later they are displaced forwards and carry these fibres with them, and thus are formed the fine radial fibres which permanently connect the two muscles.

P. S.

A. Senn (Wyl). **The Danger of Using Adrenalin too freely in Glaucoma.** *Wochenschrift für Therapie und Hygiene des Auges.* Vol. xvii.

Adrenalin is now so much employed in diseases of the eye that perhaps it is well that we should be warned from time to time of the dangers which may lurk unknown in those preparations of the suprarenal capsule. Others have published cases not altogether dissimilar to those which Senn relates, and in the *Ophthalmic Review* for July, 1903, will be found mention by MacCallan of adrenalin as a cause of increased tension. In this connection a paper reviewed in this journal for October, 1904, by Grandclèment upon the value of adrenalin in glaucoma presents considerable interest.

The first case mentioned by Senn was that of a man of 72, who had glaucoma absolutum in the left eye, and in the other the subacute variety with vision of 0·2, tension + 1, moderate cupping, a steamy cornea, and medium dilatation of the pupil. He declined operation, but under eserine his subjective symptoms disappeared, his vision rose considerably, and his tension became nearly normal. For two months this went on, when the patient returned saying that for five days he had employed no miotic, and that his vision had during that time become somewhat worse. On examination this was found to be certainly the case, his tension had become considerably raised, the pupil was medium sized, and the cornea a little hazy. Senn introduced one drop of adrenalin solution, 1 to 1,000, and one of eserine solution (1 per cent.), and sent the patient to the waiting room. In about a quarter of an hour the patient's son summoned assistance, announcing that his father was suffering intense pain in the head and had become quite blind. On inspection the eye was found to be "dead-white," the cornea very dim, the tension extremely hard, the pupil dilated to maximum, and vision only perception of hand movements. Eserine was instilled freely, the patient was given an injection of morphia, and counter-iritation to the feet, and by next morning the pupil was somewhat smaller and vision was equal to finger-counting at 1·5 metres. Gradually after the lapse of several days the eye returned to the condition in which it had been previously to the violent attack.

Senn's second case was that of a woman of 58, whose right eye, save for a low degree of perverse astigmatism, was normal; in the left eye there was hæmorrhagic neuro-retinitis with numerous extravasations of blood in the neighbourhood of the macula. As she had a cardiac lesion she was put under treatment by her physician, but returned to Senn in about four months complaining of intolerable pains in the head. The left eye was then in a state of absolute glaucoma, with a steamy cornea, some injection, a medium-sized oval pupil, and tension of + 1 to + 2; vision was completely lost. Two drops of adrenalin were administered, and in a quarter of an hour the pupil was dilated to maximum, and the eye stony hard; the pains in the head were more unbearable than ever, and the eye was finally enucleated.

Adrenalin has proved of much service in the practice of some surgeons in reducing increased tension, yet it appears as as if in certain cases its action was exercised in the opposite direction. This may not impossibly have been brought about by the dilatation of the pupil and the obstacle to the escape of fluids brought about by the constriction of the ciliary way of exit. If this maximum dilatation of the pupil is established before the contraction of the ciliary vessels, which is a second effect of adrenalin, and which tends to produce diminution of tension by diminution of intra-ocular secretion, this would naturally lead to a precipitation of an acute attack. It is to be remembered, too, that the anterior ciliary veins are exposed to the direct action of the adrenalin and, poorly supplied with muscular fibres though they may be, they are capable of constriction. When these are contracted the gate of outflow may be narrowed too much, and tension consequently may rise. If this view is correct then even in combination with eserine, or preceded by eserine, adrenalin may be capable of causing very grave mischief.

The author does not state what concentration of solution he employed in the second case, but it was presumably the same as in the first, namely, 1 in 1,000. That this is much too strong a solution for such cases most surgeons will be disposed to agree, a fact which is further indicated by the author's statement that a quarter of an hour after its instillation the globe in the first case was "glasig weiss." Had he used the drug more wisely he might not have had to record an occurrence so alarming.

W. G. S.

H. Frenkel (Toulouse). **Investigations on Arterial Tension in Glaucoma.** *Archives d'Ophtalmologie*, January.

The observations on general blood-pressure were made by means of a metal bracelet adapted to encircle the forearm and enclosing within itself a rubber bag filled with water and connected with a self-registering mercury manometer; the amount of pressure which the bracelet exercised on the front of the forearm could be varied by a screw. Frenkel is of opinion that when the pressure registered is above 130 m.m. of mercury it is pathologically raised. A large number of cases are quoted, and observations, both upon glaucomatous and non-glaucomatous patients, are recorded. The tabulated results show an increase of arterial tension in 14 out of 15 patients suffering from glaucoma, and are in striking contrast with a similar series of observations made on patients suffering from cataract. Free purgation readily reduces the arterial pressure by as much as 10 m.m. of mercury, an observation which agrees well with the beneficial effect which this treatment produces in cases of severe glaucoma; intravenous injections of saline solution have no appreciable effect upon the arterial tension.

Observations made by Frenkel on the permeability of the epithelium of the renal tubules to methylene blue are at variance with those of other observers. Frenkel finds that the pigment is eliminated more rapidly by glaucoma than by cataract patients; he thinks this may in part at any rate be attributed to the increase of blood-pressure in the former class of patients, while the subjects of cataract probably have a power of elimination which is below the normal; more observations are needed. Frenkel finds with others that the general condition of blood-pressure in glaucoma is one of hypertension; in some instances it varies with great rapidity and may at times be below the normal; observations are required on the blood-pressure at times immediately preceding attacks of glaucoma; even when these have been made, why certain patients develop chronic and others acute glaucoma will need explanation; there must be other factors yet to be elucidated, and Frenkel is obviously hoping to find them in the general constitution of his patients to the exclusion of local causes.

J. H. Fisher.

F. Daxenberger (Regensburg). **Aristol Oil.** *Wochenschrift für Therapie und Hygiene des Auges*, viii., 10.

In the treatment of lesions of the eye at present little use is made of oils save in the case of injury to the eye by burning, though ointments are frequently employed, and in some respects at all events an oil has great advantages for such use over an ointment. According to the author, Deval, a Frenchman, was the first to suggest the use of oily collyria in recent times (about 1850), and it is chiefly in France that these have been employed. The late Prof. Panas thought highly of them in some cases, and spoke strongly in their favour in respect of their asepticity when made with olive oil, their constancy, their beneficial influence in cases of loss of epithelium, and their ease of application. The reviewer has found great benefit from the employment in some conditions of a solution of one or another of the alkaloids (not their salts, for these are for the most part insoluble) in oils. In regard more particularly to the solution of eserin, Terson has expressed warm approval, and other writers also, but the superior attractiveness and convenience of the watery solutions have, in spite of certain disadvantages, prevented anything like a general adoption of the oily. No one who has employed them will fail, however, to agree with Daxenberger that there is a strong contrast between the behaviour of a patient who is about to receive a second drop of a watery solution and one into whose eye one is about to introduce another drop of oil.

As a mild antiseptic, soluble in oil and non-irritating, Daxenberger recommends aristol, of which he employs a 10 per cent. solution in oil of sesamum. After sterilisation this will keep absolutely pure for a whole year; it forms a clear reddish-brown fluid, perfectly stable and at all times ready for use without any further preparation; it never decomposes or becomes rancid. When this is dropped into the normal eye there is scarcely any sensation of unpleasantness at all, especially if the oil is at blood-heat, and in particular there is no feeling of burning or scalding. A good proof of this, he says, is the fact that dogs, who resent watery solutions very greatly, make no objection to this oily fluid, and children behave in a similar way. It is very well borne where there is any superficial lesion of the cornea or conjunctiva, such being at once soothed, as is evident from the behaviour of the patient; at the same time swelling diminishes and the discharge becomes less.

It is under four conditions particularly that Daxenberger recommends this substance. First, in nearly all inflammatory lid affections, in blepharitis with formation of crusts, after these have been removed and any diseased cilia epilated. It gives much relief to the discomfort after cautery operations to the lids or conjunctiva. Secondly, in lime-burns of conjunctiva or cornea its soothing influence is very evident, and indeed the author thinks that by its employment the extent and severity of the injury are lessened and the resulting scars smaller in size and of less density than might have been the case. Thirdly, in phlyctenular keratitis and strumous ophthalmia generally; he suggests that perhaps the iodine which is contained in small quantities in aristol may itself partly account for this beneficial action. The inflammation, pain, and spasmodic closure of the lids become rapidly relaxed when a few drops are instilled once or twice a day and gentle massage used. The eczema of the lids and face which so frequently accompanies this condition also yields readily to aristol oil. Fourthly, in traumatic abrasions of the superficial layers of the cornea it plays a useful rôle.

W. G. S.

L. Paul (Breslau). **Ulceration of the Cornea from Diplobacilli.** *Klinische Monatsblätter für Augenheilkunde*, February, 1905.

This valuable paper records 26 cases of severe ulcer of the cornea due to diplo-bacilli. We already know from the writings of Petit, of Peters, and of others (for a full list and references see the original) that simple catarrhal ulcers of the cornea, as they are called, do occur in diplo-bacillary conjunctivitis. On the other hand, the ulceration of the cornea observed has rarely been severe, and in certain of the instances pneumococci were found in addition to the diplo-bacilli. Paul's cases occurred in the course of one and a half years. The diplo-bacilli were very numerous in the floor of the ulcer and were unaccompanied by any other bacteria to which the process might be ascribed, so that the conclusion was justified that they were the cause of the ulceration. This was strengthened by the fact that most of the patients came to the clinic shortly after the appearance of inflammatory symptoms, so that it could scarcely be a case of secondary infection by the diplo-bacilli. Later examinations showed, them to be present, and to decrease during healing. Pneumococci were discovered in one case, but as it followed the typical course of an ulcus serpens, on which the diplo-bacilli had apparently no influence, it was not included in the series. Petit's diplo-bacilli were found once. In all other cases they were typical Morax-Axenfeld diplo-bacilli which were present, accompanied by a few staphylococci, mostly albus, rarely aureus, and the xerosis bacillus. Since the ulcers were nearly all of a severe nature, and since in the moderately deep disturbance of the cornea, in the purulent condition of the floor of the ulcer, in the hypopyon, in the iritis and chemosis as well as in the severity of the subjective symptoms, these resembled genuine ulcera serpentia, it was important for prognosis and treatment that the differential diagnosis should be carefully worked out. The ulcers vary in size from 2 to 5 m.m. in diameter, and were central on the cornea and without any connection with the limbus. Frequently they were shallow, but more often of moderate depth, while in six cases there was almost perforation of the cornea, in one of which a protrusion of Descemet's membrane occurred. In about half the cases the floor had a plate-like appearance, but in the others it was irregular or had infiltrated portions alternating with healing parts. The shape was generally round. In five cases there were small infiltrated spots close to the main ulcer, but separated from it by healthy cornea. They were probably due to metastases by the canals of the cornea. The floor of the ulcer was greyish-white or yellowish, and contained masses of pus cells, epithelial cells, necrotic tissue and numerous bacteria. The surrounding cornea was diffusely infiltrated, this gradually lessening towards the periphery. Only seven cases had a marked progressive margin, such as occurs in the ulcus serpens associated with pneumococci. But the former after a short time soon lost the similarity, and their further progress also confirmed the bacteriological diagnosis that they were not true ulcera serpentia. There was always great ciliary infection; iritis was frequent, leading to pupillary exudation and posterior synechiæ; hypopyon was present in 22 cases (84 per cent.), and varied from 1 to 5 m.m. in height, but it very seldom showed processes running to the back of the ulcer as is frequent in the ulcus serpens. The other deep parts of the eye were not as a rule affected, although in two cases enucleation was required, one on account of commencing panophthalmitis and the other of glaucoma absolutum.

As to etiology, in 88 per cent. of the cases there were signs of chronic conjunctivitis, and frequently the typical sign of diplo-bacillary catarrh, viz., excoriation at the inner angle. There was only once a dacryocystitis, with in five others a slight stricture of the lacrymal canal discovered by probing. In 18 cases (69 per cent.) there was a definite history of injury. The age, the sex, and the status all supported the theory of injury as the cause. Of the patients 91 per cent. were men between 18 and 80 years of age. There were no children. Their occupations were as agricultural labourers, ordinary labourers, and railway men. Most dated the origin from the injury or within a day or two of it. When they came late, *e.g.*, 2—3 weeks after the injury, the ulcer would be 8—9 mm. in diameter, while ulcus serpens would reach such a size in one or two days at most. The usual course under simple antisepsis was stationary, and then healing, leaving a delicate macula or in a few cases leucoma.

Treatment was at first more energetic than later, when the prognosis became better known. The cautery was employed five times, but its effect was not so prompt as in ulcus serpens, and it was found to be unnecessary. Zinc was much more efficacious, employed in ½ to 1 per cent. solution with a small syringe. The ulcer was thus washed several times daily. A deposit of the zinc only occurred once, and immediate change of treatment prevented any further impregnation of the cornea. Such an unfortunate accident will not happen if the zinc is only used so long as the ulcer is progressive and if simple antiseptics are substituted for it whenever the floor becomes clear. Perchloride of mercury (1:5,000) was the lotion, and the ulcer itself was powdered with airol. A bandage, kept moist with boracic acid solution, was employed where there was great chemosis. Atropin when the iritis was severe, and cocaine or aspirin with intense pain complete the list of drugs employed.

As to frequency—during the 1½ years 87 septic corneal ulcers with hypopyon and iritis came to the clinic; 41 were due to pneumococci, 26 to diplo-bacilli, 7 to staphylococci (mostly the aureus), 6 to streptococci, ozæna bacillus, Zur Nedden's bacillus or pyocyaneus, etc., while 7 times the bacteriological examination was negative. The ulcers were slightly more frequent in summer and autumn.

The usual methods of bacteriological examination were followed, and the diplo-bacilli showed all the characteristics of the Morax-Axenfeld organism. The author sometimes found difficulty in obtaining cultures of the bacillus where they were numerous on film preparations and few other organisms present. This is a difficulty the reviewer can confirm from personal experience; we must remember they are extremely delicate and show little growth energy. Petit's diplo-bacillus was found once, and the author discusses the question of its affinity with the Morax-Axenfeld germ. McNab, in a series of experiments, failed to transform the one into the other. Axenfeld has shown that the former may cause the simple typical diplo-bacillary conjuctivitis of Morax-Axenfeld, while the present paper proves that the latter may give rise to as severe corneal ulcers as we had previously known to be due to Petit's diplo-bacillus. Consequently there is the greatest probability that both bacteria are identical or separate species of the same organism, as occurs in the tubercle bacillus. All attempts at inoculation of animals or corneal affections failed. Experiments, directed to discovering the reason of the efficacy of the zinc treatment, showed that a solution of $\frac{1}{4}$—1 per cent. acting for one second to five minutes had almost no effect for cultures. It required a 1 per cent. zinc solution acting for $\frac{1}{2}$—1 hour to kill the organisms. But such a solution will not maintain this strength for five minutes in the conjunctival sac, consequently the zinc cannot act entirely as a simple disinfectant, and this is what we would expect. It is impossible to apply disinfectants to the human cornea in such strength as to kill organisms without destroying the normal epithelium of the cornea. It may be that the zinc taken into the cell body destroys it, maintaining within it the degree of concentration necessary to have a bactericidal effect.

There is also in the paper an account of the pathological examination of the case enucleated for glaucoma. Careful search failed to show any organisms in the floor of the ulcer. The changes present were those of a severe ulcer with iritis, hypopyon closure of the anterior chamber angle, and atrophy of the ciliary body. Included in the work is a tabular statement of the 26 cases. Statistics show that the diplo-bacillary conjunctivitis is very frequent in Silesia, and this will to a certain extent account for the large number of cases that the author has found. In Glasgow we do not see so many cases of Morax-Axenfeld catarrh, but, on the other hand, Weeks' conjunctivitis is very frequent. Small ulcers do occur with the former, but they are rare. The whole paper shows careful working, and all necessary details are given.

W. B. Inglis Pollock.

O. Meyer (Breslau). **Enucleation of the Eyeball under Local Anæsthesia.** *Klinische Monatsblätter für Augenheilkunde*, February, 1905.

As long ago as 1887 eyeballs were excised under the local anæsthesia produced by cocain, and since then one surgeon and another has used the method, with various modifications, but it has never become a routine practice. The advantages which it holds out are so obvious that it would probably have obtained more general acceptance if our ideas were more definite as to what cases were suitable for its employment and what were not. Dr. Meyer's paper, containing the record of a considerable number of cases, is decidedly helpful towards this end.

The method employed is called by him a "combined" one, that is to say, the separation of the anterior attachments of the globe is carried out under the instillation of cocain as for simple tenotomy, while Schleich's infiltration method is used for the deeper part of the operation. The mode of procedure is as follows:—The division of the tendons of the ocular muscles, and of any adhesions between the globe and Tenon's capsule, is carried out as usual, but with as much gentleness as possible and avoiding pressure on the globe or stretching of the muscles, while an assistant slowly drops cocain solution on the eye. Adrenalin is added to the solution if any inflammation is present. When this part of the operation is completed the slightly curved cannula of an Ahnelt's syringe is passed beneath the internal rectus to the posterior pole, and half a syringeful of the following solution is injected: Cocain hydrochloride 0·1, morphia hydrochloride 0·025, sodium chloride 0·2, distilled water 100. Two minutes are allowed to elapse, and the operation is then completed by the division of the optic and ciliary nerves in the usual way, the protrusion of the globe due to the injection rendering this step rather easier than usual.

Turning now to Meyer's cases, we find that during one year there were 115 enucleations in the clinique. In 35 of these chloroform was given, in 20 because the patient was under six years of age, and in the rest either because the eye was much inflamed or because the patient was very sensitive, or because a general anæsthetic had to be promised before the patient would consent to the operation. In the remaining 80 cases the above described method of local anæsthesia was employed. For the present purpose these cases may be divided into two main groups—inflamed eyes and non-inflamed eyes. The former group includes the cases of perforating wounds, foreign bodies, chronic cyclitis and glaucoma,; the latter cases of tumour, staphyloma and buphthalmus.

The effect of the operation on the patient was noted in every case, and out of the 80 it was found that 46 complained of no pain during the operation; these were mainly drawn from the group of non-inflamed eyes, but contained also a fair number of cases of chronic cyclitis with slightly tender globes. Twenty-four patients said that they suffered, but that the pain was bearable; these were chiefly cases of phthisis bulbi with slightly tender globes, some of perforating injury, and a few of staphyloma. In 10 cases the pain was said to be unbearable. These were all cases of chronic glaucoma and severe cyclitis, in which the patients were much broken in health and abnormally sensitive. As to what part of the operation was most painful, it appeared that out of the 34 cases in which pain was felt, in 30 it was during the first part of the operation only; and that of the four cases in which both parts of the operation were described as equally painful in three at least the posterior injection had been obviously defective owing to a part of the fluid escaping. As to the after effects, no special untoward results were noted as compared with cases in which a general anæsthetic was used.

In summing up, the author points out that if the ideal anæsthetic should combine entire safety and entire painlessness then this process must be admitted to satisfy fully the former requirement only; but the operation is a short one, and the pain is, in suitably chosen cases, reduced at any rate to a very moderate and bearable amount; no one, he reminds us, would think of abandoning the operation of tenotomy or advancement under cocain, simply because it is not absolutely free from pain.

W. G. L.

Uribe y Troncoso (Mexico). Experimental Researches on the Filtration of Saline and Albuminous Fluids through the Anterior Chamber and its Role in the Genesis of Glaucoma.

The researches of Niesnamoff, made by means of the special manometer apparatus devised by Leber, showed that the quantity of fluid (a 0·75 per cent. solution of NaCl) which can be passed into the anterior chamber of a fresh human eye is 5·5 cb. m.m. per minute, but this is not the real amount of filtration into the canal of Schlemm. Leber and Bentzen found that in glaucomatous eyes the filtration was only 0·19 cb. m.m., *i.e.*, $^1/_{25}$ of the normal.

Troncoso, being convinced that not only the quantity but the quality also of the secreted liquids influences the production of glaucomatous symptoms, proved by chemical analysis of the aqueous humour obtained from eyes affected with glaucoma that a large quantity of albumen in the anterior chamber is the determining cause of osmotic difficulty at the iridic angle, and that this factor begins a vicious circle ending in the adhesion of the root of the iris to the cornea. A short abstract of Troncoso's former paper appeared in the *Ophthalmic Review* in 1903 (Vol. xxii., 31). For the experiments recorded in the present article Leber's manometer was used. It is an apparatus by which fluid can be forced at any given pressure through a needle introduced into the eye experimented upon, and at the same time the quantity of fluid passing into the eye is easily and accurately measured. The fluid used was normal saline most carefully filtered. The quantity of fluid which leaves the manometer and passes into the anterior chamber does not represent the real filtration because the quantity of liquid that passes out of the eye which can be collected and weighed is less than the amount that passes in. The difference depends on the capacity of the anterior chamber, and is greater or less according as the vitreous is more or less compressed by the pressure of the fluid injected, a fact that is confirmed by the increased depth of the anterior chamber.

The experiments instituted to measure directly the quantity of filtered liquid which is found on the surface of the eye after the experiment (the quantity that entered the eye being known) show that an important quantity escaped filtration even if the amount of fluid that entered the eye in the first minute, and which served to distend the anterior chamber, is deducted. If, however, absolute accuracy is aimed at, precautions to prevent evaporation must be taken. Comparison of the weights of the eye before and after the experiment proves that a certain quantity of liquid remains in it. This quantity, which is less than that which enters the eye in the first minute, indicates that in some cases a proportion of the liquid serves to maintain the debit of filtration, although the pressure of the liquid injected diminishes during the continuance of the experiment, owing to the fall of the mercury in the manometer (10 m.m. of pressure for every 400 m.m. that the apparatus registers as entering the eye). The exact intra-ocular tension can be determined by a small manometer, and it is found to vary between 0 and 20 m.m. of mercury. Such variation ought not to happen if the filtration were constant, as then the intra-ocular tension ought to remain the same after first arriving at a position of stability. The actual figures obtained were, as soon as fairly constant value was obtained, 7 or 10 m.m. of mercury, but later it continued to rise to 10 or even 15 m.m., but without ever being equivalent to the pressure of filtration. The apparent filtration in the same case varied from 1 to 6½ cubic m.m. per minute, while the pressure at which it entered the eye from the manometer was 25 m.m. of Hg.

To discover the influence of albuminous liquids on the co-efficient of filtration, solutions of 1 per cent. to 6 per cent., obtained by dilution of blood serum from the dog and the horse, were employed. As the filtering capacity varies very greatly in different eyes it was necessary to test each one with normal saline first of all. In all cases when eyes in a good state of preservation were used there was a notable diminution in the filtration when the solutions of albumen were substituted usually to $^2/_5$ or $^3/_5$ of the amount obtained with the saline. The diminution was not, however, proportional to the concentration of the solutions, which fact is easily explained when it is remembered that the experiments only lasted 15 to 30 minutes, and that the colloid albumen was mixed with a large proportion of crystaloids, which latter filter through more rapidly, thus allowing a further supply of albumen to enter the anterior chamber from the manometer. In fact, if the experiment is continued for some hours the filtration continues to diminish and finally stops. It was further shown that when the 6 per cent. solution was passed into the eye the filtrate only contained 3 per cent. In the eye *in situ* osmosis of albumen from the anterior chamber must be more difficult, and owing to its having to pass into the blood, which contains much albuminous substances and therefore in pathological conditions only difference in pressure could produce any osmosis at all.

The pressure that exists in the vitreous is a factor of great importance, because to it is owing the closure of the irido-corneal angle. Leber and Niesnamoff did not take this into account and therefore their figures are too high by almost 50 per cent.; the real value is 2·6 mm. per minute in place of 5·5 in man at 25 mm. pressure. If by special means the pressures in the vitreous and the anterior chamber are kept equal the iris remains vertical, and therefore there is no increase in depth of the anterior chamber. If the pressure in the vitreous is gradually raised, filtration will diminish and will cease altogether when it is 3 to 5 mm. above that in the anterior chamber, but it can be restored by lowering the vitreous pressure. The explanation of the phenomenon is the blocking of the angle by the crowding of the base of the iris against the sclero-corneal reticulum and obliteration of the angle. Microscopic sections show this perfectly. Admitting that the real filtration is only 2·6 mm. in man, the secretion of the aqueous is only 1·6 mm. per minute, because according to Niesnamoff's experiments it is equal to the difference between the filtration in the dead eye, which is 2·6 mm., and the filtration in the living eye, which is 1 mm.

Troncoso maintains that his later researches confirm the pathogenic theory of glaucoma propounded by himself four years ago which he supported by the chemical analysis of the aqueous humour in 11 cases of glaucoma, in all of which it contained albuminoid materials up to 3 per cent. The difficulty of filtration which is produced by the presence of colloid substances is the genitor of the cycle of phenomena which end in the glaucomatous state. In acute glaucoma the retention of the intra-ocular fluids produces venous stasis and œdema of the vitreous, which in turn results in the crowding of the root of the iris against the cornea, at first mechanically and temporarily, but eventually permanent adhesion takes place when the altered vitreous no longer recovers its normal volume in the interval between the attacks.

J. Gray Clegg.

W. Reis (Bonn). **The Pathology of Congenital Hydrophthalmos.**
v. Graefe's Archiv für Ophthalmologie, 60, 1.

In this long and careful paper the author gives a very full record of the pathologico-anatomical changes which are found in the eye in seven cases of congenital hydrophthalmos. With each case there is also a brief note of the clinical history, and figures in the text illustrating the appearance of the globe, whilst there are eleven well-produced photomicrograms on special paper showing special points in the anatomy which are of importance.

Having recorded his cases, Reis goes on to review and criticise the various theories which have been put forward, at different times and dates, to account for the series of changes involved in the condition. He disputes the theory that the affection is merely an overgrowth of the eye, and agrees with Warlomont that increase of the intraocular tension is the prime factor in causing distension of the globe. The fact that the enlarged eye may retain good vision is explained by the assumption that, owing to distension of the tissues, there is a restoration of the balance between the intraocular pressure and the resistance of the tunics, and that for this reason the eye may cease to enlarge before destructive changes in the interior are brought about.

Considering the affection, then, as a species of infantile glaucoma, the author goes on to look at the two great divisions of the causes of increase of tension. These are, of course, the hyper-secretion theory and the obstruction theory. Whilst the former is afforded but little support by evidence, the latter is, on the contrary, well supported. The state of the angle of the anterior chamber in hydrophthalmos is considered, and it is found that in about 50 per cent. of cases the filtration spaces are not closed by the iris being pressed forward against the cornea. The author then goes on to show that there is obstruction of the anterior scleral canal, and proceeds to demonstrate that this is the cause of the increase of tension which must precede the distension of the globe. Goldzieher's view regarding the influence of chorioidal atrophy in the production of changes which lead to serous transudation and also to obliteration of Schlemm's canal is fully discussed. v. Hippel's case of hydrophthalmos, in which there was no sign of disease of the chorioid, and others indicate that there is no clear connection between chorioidal atrophy and hydrophthalmos.

The only constant factor in the pathologico-anatomical changes found in cases of hydrophthalmos, according to Reis, is obliteration of the anterior scleral venous channels. This, in some cases at all events, is possibly a congenital defect, and the author quotes largely from literature to show the feasibility of this view. Thus, the association of consanguinity of parents with hydrophthalmos in the offspring is noted in several cases, as also the association of the disease with other well recognised congenital defects.

The paper is well worth reading by those specially interested in the subject, and a long list of references indicates the painstaking completeness with which the writer has worked up the subject. LESLIE BUCHANAN.

ORLANDO PES (Turin). **The Hyaline Bodies and Papillary Formations of the Choroid.** *v. Graefe's Archiv für Ophthalmologie*, lix., 3.

IN a resumé of the literature on this subject the author points out the diversity of the opinions held by other workers, some of whom state that the hyaline bodies are formed by degeneration of the cells of the pigment layer of the retina, others that they are generated by secretion from the pigment cells. Wedl and Bock considered them to be an exudation product of the vessels; Rudnew says they are generated by a metamorphosis of emigrated white blood corpuscles. The anatomical process of these formations, the author says, is well known to consist in a degeneration of the cells of the pigment, disappearance of the nuclei, dissolution of the pigment and after colloid degeneration ends in a globular fusion of the cell elements. There are described numerous figures of preparations from enucleated eyes in which can be observed the different stages in the process of formation of these hyaline and papillary bodies.

The author could not demonstrate, on account of the hardness of the specimens, the concentric striation of the papillæ as described by Schieck and others. The results of these observations are summarised as follows:—

1. The hyaline nodular formations of the choroid arise from the degeneration of the pigment epithelium of the retina.

2. Fibrin deposits in the retina may simulate hyaline nodular formations.

3. Papillary bodies are formed as the result of inflammation in the choroid.

4. Papillary bodies in the last stage of atrophy and sclerosis take the appearance of real hyaline bodies; they must, however, be differentiated from those which arise through the degeneration of the pigment epithelium.

5. In atrophied bulbs there may be found, on account of separation of the choroid, thick villus-like papillæ which may be atrophied and sclerosed.

H. HORSMAN McNABB.

CHARLES BLAIR (London). **Errors of Refraction.** Bristol: John Wright and Co., 1905.

THIS is a handy little "clinical pocket-book for practitioners and students," of 100 pages. It contains nothing new, nothing freshly put, nothing but the baldest statements as to errors of refraction and their treatment, a sort of inspissated extract of the knowledge and art of the optical side of ophthalmology. Its place is consequently not high in the scale of literature, but it will serve its purpose quite well, if it is to be admitted that it is only to be employed as an adjunct to a larger and more "intelligent" guide. For our own part we question on general grounds the wisdom of employing such books on any subject, they give a man crude views, cut and dry opinions whose truth he has to swallow wholesale at the moment and which he often comes seriously to doubt afterwards if he grows wiser; he has at the time no means of distinguishing between the facts of science and the fallible opinions of the author, for there are set down side by side with no indications as to which is impregnable rock and which is—not. We do not mean that Mr. Blair's book is any worse in this respect than others: not at all; it is of the class we speak now, not of the individual member of it. "Errors of refraction" seems quite sound so far as it goes, we have detected nothing in it with which it is necessary to find fault, even if there be little to praise, for there is nothing but what is well known. Where opinions are expressed and rules laid down there is, of course, room for divergence of views.

CLINICAL NOTES.

Artificial Ripening of Cataract.—Förster's well-known method has a number of adherents, but many surgeons regard it as unnecessary, and some as highly dangerous. Some years ago Wolffberg (Breslau) devised a "hot-air douche," an apparatus for directing a blast of warm dry air upon the eye; this he has found of great service in the treatment of neuralgia (supra-orbital), iritis, strumous keratitis with blepharospasm and photophobia, etc., in short, in most of those diseases of the eye in which pain is a prominent feature. Meditating on the occurrence of glass-blower's cataract, he bethought him to try whether by means of this "calorisator" he could influence the formation of cataract. He made use of an instrument consisting practically of a spirit lamp, a blast, and an asbestos tube along which the heated air is driven. It is obvious that one would require to be very cautious in directing this upon the eye, but the heat is soon dissipated, and at 10cm. from the mouth of the tube the temperature is not higher than about 70°C. At the first onset the eye (we are not astonished to learn) is convulsively closed and the conjunctiva becomes injected, remaining so for perhaps an hour after cessation of the blast. At first also the eye waters considerably, but this passes off. He has usually employed the douche for five minutes or so at a time, with intervals, and after a little the patient can be trusted to apply to himself the greatest heat which can be borne without real discomfort. As regards results, his figures are too small as yet to be relied upon. Other surgeons have made tentative efforts to ripen partially opaque lenses by means of heat, but we have not observed any records of success with this method.—*Wochenschrift für Therapie und Hygiene des Auges*, 22nd September, 1904.

Hemiachromatopsia. — Poulard (Paris) records another example of this rare condition. It occurred in the person of a man of 67, who on a certain night was attacked by severe hemicrania, but on which side this was present the author does not tell us. He had had transient attacks of loss of vision after much reading for some time, and the particular attack followed upon a long spell of reading. On attempting to read he felt great difficulty, could not see a whole line at once, and would stop short in the middle of a sentence or phrase, and go on again. When looking fixedly at a sheet of white paper it appeared to him that the left half had lost its whiteness and was gray; the left half of a coloured sheet of paper seemed colourless, grayish. The central vision, on correction of myopia, was "$\frac{1}{3}$" in each eye, and to the ordinary perimeter there was a little restriction of the left portion of the field. There were absolutely no left colour-fields whatever, and if a sufficiently small *white* test object (2 m.m. at 2m.) was employed again the left field was entirely absent. This is in accordance with the results obtained in other cases of hemiachromatopsia, namely, that the form-sense is also lowered.—*Archives d'Ophtalmologie*, January, 1905.

ANTIPYRINE IN OPTIC ATROPHY.—In 1893 Valude wrote an article advocating the subcutaneous use of antipyrine in optic atrophy. He returns to the question of its employment, and states that since then he has used the drug with varying success, and has thus come to the conclusion that antipyrine is of service in one form of atrophy only, namely, the descending variety, where the wasting is secondary to an acute cerebral lesion. Perhaps the most typical condition is that in which the atrophy takes its origin in typhoid fever with cerebral complications. It has no value in simple atrophy, in toxic cases, in retro-bulbar neuritis, in tabetic atrophy, in atrophy secondary to choroido-retinitis, etc. The method employed in suitable cases is to inject into the dorso-lumbar region every second day 2 cubic centimetres of a 50 per cent. watery solution, containing $\frac{1}{8}$ per cent. cocain. If no effect is shown after 25 injections the treatment need not be proceeded with.—*Annales d'Oculistique*, March.

SUPERHEATED DRY AIR.—No one doubts that, if we could once hit upon a really good way of applying it, super-heated dry air playing upon the eye would be a valuable therapeutic agent. Ostwalt describes an apparatus of a simple character which he has devised, and which seems to answer well. Roughly speaking, it consists of a coiled tube enclosed, along with a lamp, in a small special box. Through the coil the patient can, by means of a rubber bag, blow air, which becomes heated on its way, and is made to play upon the affected eye. In this way a temperature quite as high as the average patient can comfortably stand can be reached in a very brief space of time. Most patients will stand 100° quite well, while some can endure even as high as 175°. This is higher than the skin can generally bear, probably on account of the lachrymation and consequent evaporation and cooling which constantly goes on. It is best after a *séance* of 5 to 8 minutes to extinguish the flame and go on blowing: the temperature thus becomes gradually lowered, and the eye better bears exposure to the ordinary air again; but even with this the injection is pretty severe and it is better to pad the eye warmly with cotton wool for a time. For a description of the apparatus, which is made by Prunier (Paris), Ostwalt's paper should be consulted.—*Annales d'Oculistique*, March.

OPAQUE NERVE FIBRES IN THE RETINA.—Mayerweg remarks that it is not yet fully understood what causes the appearance of medullated nerve fibres in the retina. Most authors regard these as a congenital "error," and some have argued that the (alleged) frequent presence of other congenital deviations from the normal,—persistent hyaloid artery, unusual form of conus, etc.—forms an argument in favour of this view. von Hippel concluded that the condition is not, strictly speaking, a congenital abnormality, but that a predisposition to its development is congenital; he has pointed out that of all the cranial nerves the optic is the most backward in the formation of medulla, so that the condition is not so likely to be congenital. Mayerweg describes the formation of connective tissue on the internal limiting membrane; he thinks that this, with its close attachment to the layer of medullated nerve fibres, and its connection with the central cord of connective tissue and with that of the vessels, may have an important bearing. He holds that it may have the same nutritional relation to the medullated nerve fibres in the retina that it possesses in the optic nerve, an idea which is favoured by the fact that it contains blood-vessels.—*American Archives of Ophthalmology*, xxxiv., 1.

WASHING OUT AS PART OF THE OPERATION OF EXTRACTION.—In an article dealing with this manœuvre Lagrange and Aubaret advise the use of a special syringe of which the chief feature is that at each plunge of the piston it acts both by injection and aspiration; the fluid which they employ is based as precisely as possible upon Lohmeyer's analysis of the aqueous humour, and consists of water containing in 1,000 grammes, 6·89 of chloride of sodium, 0·113 of chloride of calcium, and 0·221 of sulphate of potassium. They divide the cases into (1) a group in which the method is indispensable, namely, swollen lenses, cataract with lowered tension, and those in which, though the opacity of the lens may be complete, the substance comes away with considerable difficulty; these are observed both in young persons and among patients whose cataracts are complicated with choroidal degeneration; in such cases, the authors say, the secondary membrane is apt to be tough. (2) A group in which the lavage is useful, semi-soft cataracts, with difficulty of complete evacuation, and cases in which there has been hæmorrhage into the anterior chamber, milky cataracts in children, and cases in which the lens is being removed for the relief of myopia. (3) A group in which lavage is contra-indicated or is useless, in particular those in which the lens is hard and comes away leaving a clear pupil. They point out, what is not sufficiently realised by those who have not tried it, that the procedure is in no sense dangerous, and need not be dreaded, and that it is quite painless. —*Archives d'Ophtalmologie*, February, 1905.

PROPHYLACTIC TREATMENT OF SYMPATHETIC OPHTHALMIA WITH MERCURY.—It has been suggested that since the internal use of mercury is so beneficial when sympathetic ophthalmia has once been established, it might be well to employ that drug as a prophylactic in cases of injury of such a nature as to excite some risk of this dreaded disease. The beneficial action of mercurial treatment under such circumstances may be explained in a sense by the theory that in addition to the direct injurious influence of the trauma there is an endogenous injurious influence localising itself at the site of injury as the *locus minoris resistentiæ*. In cases in which suppuration occurs the use of mercury is useless, perhaps may be harmful, but in those in which without suppuration prolonged injection, irritation, and tenderness are present, whether the globe has been perforated or not, this method of treatment will be found to do much actual good and probably to save from subsequent worse evil.—Heddaeus. *Wochenschrift für Therapie und Hygiene des Auges*, viii., 12.

TRACHOMA TREATED BY RADIUM.—Acting on the lines indicated by others, that radium was capable of influencing the growth of tumours, Cohn (Breslau) bethought him of applying it to the new formations in the conjunctiva which form the essential element in trachoma. He brought the end of a fine glass tube containing a minute quantity of radium into approximation with each of the granulations, and found that these disappeared rapidly and without pain to an extent which with ordinary means would have required months of treatment. He has not seen any evil results follow, but has had only a very small number of cases under observation as yet.—*Wochenschrift für Therapie und Hygiene des Auges*, vii., 14.

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EARLY DETACHMENT OF THE RETINA IN CASES OF SARCOMA OF THE CHOROID.

By J. Herbert Parsons, D.Sc., F.R.C.S.

Since August, 1901, I have examined anatomically fifty cases of sarcoma of the choroid and ciliary body; some of these cases were in an early stage, the tumours being quite small. I have been struck with the frequency of detachment of the retina in these early cases. Usually the retina is not extensively detached in the immediate neighbourhood of the tumour; it is merely raised by the growth, with which it lies in intimate apposition. In the lower hemisphere, however, there is often an extensive shallow detachment. If the growth is in the upper part of the fundus this detachment is wholly separate from it, the retina being in normal apposition to the choroid in the intervening area. If the tumour is near the horizontal meridian of the eye the retina may be apposed to it above, whilst below it merges into the inferior detachment, separated from the choroid by albuminous coagulum. Every stage may, therefore, be met with, from a small isolated tumour with a simple detachment of the retina over the lower hemisphere, to a more extensive detachment continuous with that over the growth, ending finally in the infundibular detachment which is well known in the latest stages, the retina here being completely detached from the choroid.

The following eight cases illustrate this condition of early retinal detachment, and show how important its recognition is from the clinical standpoint. They must not be regarded as a just estimate of the occurrence in the total number of cases examined, for most of these had already gone on to the development of complete detachment; moreover, it was only after I had examined a considerable number that my attention was drawn to the fact, which does not seem to have received the consideration in the literature of the subject which it undoubtedly deserves.

All the eyes were hardened in 10 per cent. formol, then frozen and bisected. Only such data are recorded as are necessary to the purposes of this paper.

Case i. D.R., male, æt. 56, was admitted to the Royal London (Moorfields) Ophthalmic Hospital on 19 Oct., 1901. The vision in the L. eye had been noticed to be defective for a year.

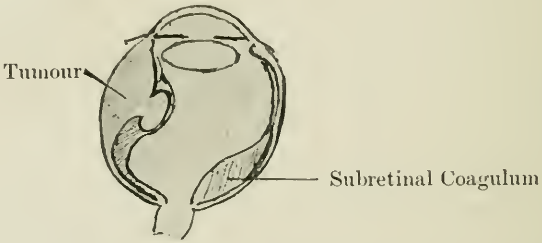
R. eye. V.$=^{6}/_{9}$; with $+3=$Jaeger 1.

L. eye. Anterior perforating vessels somewhat enlarged and tortuous. Cornea clear. A.C. good; rather shallower than R. Pupil reacts normally. Lens clear. Detachment of retina above, opaque yellow upwards and anteriorly, with an indefinite haze in front. T. normal.

28 Oct., 1901. L. excision.

Sagittal section of the globe showed a fairly large growth in the ciliary body and anterior part of the choroid above. It had the typical mushroom-shape of a choroidal tumour. It was nearly white. It was closely covered with retina at the summit; the retina shelved off posteriorly, and was slightly detached almost as far as the optic disc. In the lower hemisphere there was an extensive simple detachment, undoubtedly *ante mortem*, since the subretinal space was filled with albuminous coagulum. (See Fig. 1).

Fig. 1.



CASE II. C.N., male, æt. 36, was admitted to the Royal London Ophthalmic Hospital on 28 Jan., 1902. He had noticed a "fluttering" in the outer side of the R. eye about three years. Sight began to fail seriously about a month previously.

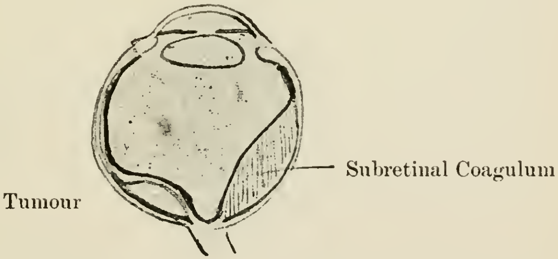
R. eye. Anterior perforating vessels dilated. Cornea clear. A.C. normal. Pupil reacts directly and consensually tc light. Lens, slight axial opacity. There is a considerable detachment of the retina above the disc, the lower margin being convex; vessels run evenly over the surface. There is also a simple detachment below. There is a relative scotoma for green only over the upper detachment, and a total scotoma over the lower one. V.=$^6/_{18}$. T. normal.

L. eye. V.=$^6/_6$. T. normal.

1 Feb., 1902. R. excision.

Sagittal section showed a white growth, with some slight pigmentation, 10mm. broad by 5mm. thick, just above the disc. The retina was closely apposed to the surface. Below the disc there was a large, shallow, simple detachment, the subretinal space being filled with albuminous coagulum. (See Fig. 2).

Fig. 2.



CASE III. A.H., male, æt. 32, was admitted to the Royal London Ophthalmic Hospital on 19 Aug., 1902. The right eye had been weak, "with a green patch in front of it," for five or six weeks. There was a detachment of the retina down and out, commencing about three papilla-diameters from the disc, and continuing over the greater part of the lower hemisphere.

L. eye. V.=$^6/_6$.

18 Oct., 1902. R. excision.

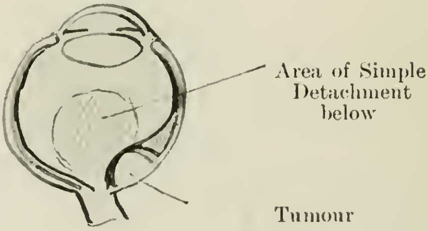
Section of the eye in a direction slightly down and out revealed an oval tumour, extending down and out from the macula: long axis 10mm., short axis 8mm.; upper edge, 2mm. above the level of the macula. There was a simple detachment of the retina below the tumour, the subretinal space being filled with albuminous coagulum.

(This case is described in extenso by Silcock and MacCallan, in the *Transactions of the Ophthalmological Society*, xxiii., 1903).

Case iv. H.L., male, æt. 47, was admitted to the Royal London Ophthalmic Hospital in Feb., 1903. Dimness in the upper and outer part of the L. field of vision had been noticed about the end of October, 1902, and had gradually increased.

R. eye. V.=$^6/_6$. T. normal.

Fig. 3.



L. eye. Cornea and A.C. normal. There was a large retinal detachment on the nasal side, only about one-eighth of the disc being visible. The surface was smooth, the sides steep; there were some hæmorrhages upon it, and the anterior part was bluish-black. V.$=^6/_6$. T. normal.

5 Feb., 1903. L. excision.

Horizontal section showed the presence of a globular, mottled tumour of the choroid, 7 mm. in diameter. There was a large shallow simple detachment in front and over a large area below. (See Fig. 3).

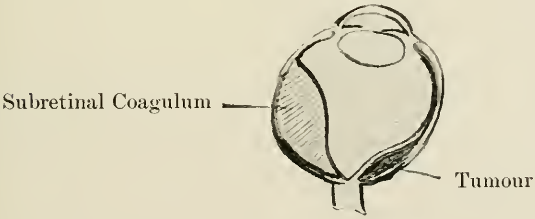
Case v. J.M., female, æt. 48, was admitted to the Royal London Ophthalmic Hospital in Feb., 1903. The vision of the R. eye had been failing for two years.

R. eye. Cornea clear. A.C. good. Iris, hippus; reacts directly and consensually to light. Lens clear. Retina detached over a considerable area in the posterior part of the upper hemisphere; swelling = 6 D. There are patches of pigmentation above the swelling and at the macula. The detachment does not move on moving the eye. V.= counting fingers at 6 inches. T. + 1.

L. eye. V.$=^6/_6$, Jaeger 1, T. normal.

Sagittal section showed a lens-shaped growth, 7mm. broad by 2mm. thick, covering half the disc, and extending upwards; pigmented. The retina was apposed to the tumour. There was a large, simple detachment over the whole of the lower hemisphere, separated from the choroid by albuminous coagulum. (See Fig. 4).

Fig. 4.



Case vi. E.G., female, æt. 32, was admitted to the Royal London Ophthalmic Hospital on 4 Dec., 1903, complaining of a mist over the R. eye of one months' duration. There had been a blow on this eye seven years previously.

10 Dec., 1903. R. eye. Brown pigmentation above the cornea. Detachment of the retina up and out from the macula, not involving it; irregular, mottled surface; does not move; swelling = 7 D. $V. = {}^{6}/_{18}$. T. normal.

R. eye. $V. = {}^{6}/_{6}$. T. normal.

11 Dec., 1903. R. excision.

Sagittal section showed a small sarcoma of the choroid up and out from the macula, with the retina raised but in close apposition. There was a large simple detachment in the lower hemisphere, with a subretinal coagulum. The choroid was deeply pigmented throughout.

Case vii. C.B., male, æt. 39, was admitted to the Royal London Ophthalmic Hospital on 6 Dec., 1904, complaining of a feeling of irritation in the L. eye as of a hair in the eye, for six months, and of watering and dimness for ten weeks.

R. eye. $V. = {}^{6}/_{6}$. Jaeger 1.

L. eye. There are two large detachments of the retina. The upper one is above the disc, of which it hides the upper quarter. The lower one is an extensive shallow detachment over the lower hemisphere. $V. = {}^{6}/_{24}$.

27 Jan., 1905. L. excision.

Section of the L. eye in a direction down and in showed a white sarcoma of the choroid above the disc, 8mm. broad by 3mm. thick. There was a large simple detachment below, lying on a subretinal coagulum.

Case viii. E.P., male, æt. 49, was admitted to the Royal London Ophthalmic Hospital on 20 Feb., 1905, complaining of dimness of the R. eye for 14 days. There was a shallow semi-transparent detachment of the retina below; the field of vision showed a corresponding defect. V.$={}^{6}/_{36}$.

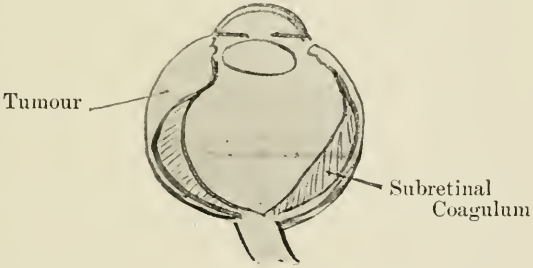
L. eye. V.$={}^{6}/_{6}$.

14 March, 1905. On dilatation of the pupil a dark mass was seen to the inner side, with a nodular surface, involving one-sixth of the circumference. It could be seen only on looking in very obliquely.

15 March, 1905. R. excision.

Horizontal section showed a whitish tumour of the inner part of the ciliary body. There was a shallow detachment of the retina behind the growth and over the whole of the lower hemisphere. (See Fig. 5).

Fig. 5.



These cases prove:—

1. That detachment of the retina occurs earlier in sarcoma of the choroid than would be gathered from the ordinary text-book description.

2. That, apart from the elevation at the site of the growth, where there is no true *detachment* in the early stages, the detachment manifests itself invariably as a shallow, simple detachment over the lower hemisphere.

3. That this detachment is frequently entirely isolated from the tumour, the intervening retina being in normal apposition to the choroid.

4. That this is invariably the case when the tumour is in the upper hemisphere; when the detachment is continuous with the elevation at the site of the tumour it is, in the early stages, merely due to the accident of the position of the growth, *i.e.*, near or in the lower hemisphere.

5. That this isolated detachment is simply the first stage of the total detachment which eventually supervenes.

These deductions do not apply to the earliest stages of sarcomata of the ciliary body, for here there is no detachment of the retina, the pars ciliaris retinæ remaining closely applied to the surface of the growth. It is only at a later stage when the tumour encroaches upon the choroid that detachment of the retina occurs.

There can be little doubt that the detachment is due to secretion of fluid from the choroid. The tumour acts as an irritant or foreign body, so that more fluid than normal is poured out from the vessels. There is histological evidence of this irritation in the round-celled infiltration which is found in the quasi-normal choroid at the periphery of the growth. In the case of the ciliary body the pars ciliaris retinæ is firmly adherent, and cannot readily be raised; nor can the fluid pass into the space between the retina and choroid, owing to the firm attachment at the ora serrata. Hence the fluid passes direct into the vitreous and is excreted at the angle of the anterior chamber. It is probable, too, that the lymph flow within the ciliary body is freer than in the choroid, so that excess of lymph is, to a large extent, carried off by the perivascular lymph spaces around the perforating veins.

In the case of the choroid the fluid accumulates beneath the retina, at once gravitating to the lowest part. Hence the detachment invariably commences in the lower hemisphere.

The fluid which is secreted is not the normal lymph of the eye. If it were it would have the characteristics of aqueous, and would readily pass into the vitreous, and be excreted by the normal channels. On the contrary it is a highly albuminous fluid, resembling blood plasma rather than lymph. This is due to the fact that the choroidal vessels are engorged and diseased, so that, in spite of the support afforded by the intraocular pressure, the vessel walls are unable to prevent the albuminous constituents from filtering out.

It is due to the highly albuminous character of the subretinal fluid, not only that it accumulates beneath the retina, but also that secondary glaucoma supervenes. The slow growth of the tumour is usually inadequate to induce glaucoma, for the increase in volume of the solid contents of the globe caused by its presence is easily compensated for by shrinking of the vitreous. The glaucoma is caused by the accumulation of large quantities of albuminous subretinal fluid which is imprisoned by the retina and cannot filter out of the eye. Hence, as soon as the vitreous sponge has been squeezed dry, the lens and iris are forced forwards, and the angle of the anterior chamber becomes blocked.

That the recognition of the fact that detachment of the retina, isolated from the tumour, occurs early in the history of sarcoma, is of great clinical importance, is demonstrated by the clinical notes of the cases recorded. The most common error is happily one of comparatively little consequence, viz., the failure to recognise the shallow detachment in the lower hemisphere. The presence of a choroidal growth is correctly diagnosed, but the inferior detachment of the retina escapes observation. Case 2 is particularly instructive in this respect. Here, the tumour was diagnosed after an ophthalmoscopic examination. The field of vision was then taken out; no scotoma was found corresponding with the site of the growth, but there was a large defect in the upper half of the field. Further ophthalmoscopic examination revealed the presence of the shallow inferior detachment, which had previously escaped observation. On again, taking out the field, with greater accuracy, it was found that there was a relative scotoma for green in the area corresponding with the site of the tumour.

Another and more serious error is the diagnosis of the inferior detachment as an idiopathic detachment, the tumour being missed. As in Case 8 the tumour may be beyond the limits of the field of ophthalmoscopic vision. Here the presence of a tumour was only demonstrable on dilating the pupil to its widest extent, and then only on very oblique examination.

It is noteworthy that the tension is not necessarily raised at the stage in which the inferior detachment is already present; indeed it is seldom raised until the detachment has become general. (Compare Case 5).

It is therefore of the utmost importance that *in all cases of apparently simple detachment of the retina the most careful search for a tumour should be made by thorough investigation of the field of vision, and by thorough examination with the ophthalmoscope and by oblique illumination with the fully-dilated pupil.*

REVIEWS.

Redslob (Berne). **Bitemporal Hemianopsia and Diabetes Insipidus.** *Klinische Monatsblätter für Augenheilkunde*, February, 1905.

Several cases are now on record in which bitemporal hemianopsia has been observed in association with diabetes insipidus, and these fall into two categories, namely, those in which an intra-cranial neoplasm has been present, and those in which a trauma has been the distinguishing feature,—syphilitic tumour being included under the head of neoplasm. The trauma has usually been a fracture of the base of the skull. Out of thirty-nine cases of bitemporal hemianopsia Wilbrand found diabetes insipidus four times, Keil twice out of sixteen, and Kruse seven times out of thirty-four. In a large majority of the cases there is a history of syphilis.

The cases are somewhat more numerous in which a trauma has given rise to the coincidence of these two symptoms, but in certain of these the polyuria was only temporary. Nieden, among others, has described two very typical cases occurring in miners; in each it seemed certain that a fracture of the base had involved also an injury to the chiasma. Redslob relates an interesting case also, which is so typical as to deserve a more extended account. It was that of a girl of 14, who received a blow on the back of the head from a sack of corn weighing fully two hundredweight. She was struck down, rendered unconscious, and bled from mouth, nose and ears; the insensibility lasted five hours. There was evidence that the left orbit was involved in the fracture. Three months after the accident the report says that the patient was still suffering from constant thirst and very frequent urination. The patient complained of much headache, especially on the left side, and loss of sight. Curiously enough, the hemianopic pupil reaction was most uncertain; one day the contrast would be well marked and another it could not be made out. Both discs were a little pale, especially the temporal quadrant of the right eye; there were no signs of hæmorrhages in the fundus. Perimetric examination indicated the existence of a complete bitemporal hemianopsia, the line of demarcation passing precisely through the fixation point. Vision of the right eye only reached 0·5, that of the left 0·9. Under medical treatment the polydipsia and polyuria rapidly diminished, but later the whole train of symptoms recurred again.

In this case a fracture of the base seemed practically certain, and as regards the hemianopsia, nothing save an injury at the chiasma,—hæmorrhage or an actual rupture,—can account for it, and it seems the most simple explanation that the line of fracture had reached the sella turcica. It is very rare, however, to find in traumatic cases the precision which is here displayed, for the hemianopsia is quite typical; in other cases one eye is apt to be more or less amaurotic, and the other to show merely the temporal fault. In this case there is also the additional intra-cranial lesion which has caused the diabetes insipidus, a coincidence of symptoms which, as above mentioned, has occurred in other cases also. In the first case published Spanbock and Steinhaus considered that the coincidence must be simply accidental, since the possible seats of these two lesions were so far separated in the cerebrum. As everyone knows, Claude Bernard succeeded in producing polyuria by lesion of the floor of the fourth ventricle, and in consequence diabetes insipidus has to a large extent been looked upon as an indication of a lesion in that situation,—at all events by those authors who look upon polyuria as the primary symptom of diabetes insipidus. The action of this lesion in increasing the flow of urine was attributed by Bernard to the influence which it exercised upon the vascular condition in the abdomen; but this polyuria is merely temporary, and in the present connection the experiments of Kahler are of more interest, who was able in rabbits to produce permanent polyuria by circumscribed cauterisation in the medulla and cerebellum,—in the lateral portion of the medulla and the *corpus trapezoide*. He considered that any one of a number of lesions, provided it lies in this region, is capable of producing diabetes. These pathological changes have been caused by tumours, softenings and even by traumata. So far diabetes insipidus has not shown itself to have any localising value, for the lesions producing it have been in very different situations; in only one case has the neighbourhood of the chiasma alone been involved, one in which there was a carcinoma of the pineal body.

Of acromegaly, in which the chiasma is apt to be involved and bitemporal hemianopsia to recur in consequence, one of the symptoms frequently met with is polyuria, which might lead one again to associate these lesions locally, but the alteration in the quantity and quality of the urine is probably not of any such nature, but a result merely of the polydipsia and the colossal appetite. The situation, a lesion of which can cause a true cerebral diabetes insipidus, is, according to Kahler, as we have seen, in the posterior fossa of the skull, and quite away from the chiasma; a lesion of the latter organ and its immediate neighbourhood is quite incapable of causing that symptom, but since the injury which causes the appearance of diabetes and hemianopsia together is always a severe one, there is no reason for doubting that damages in two situations may have occurred at the same time. There is always the further possibility that in some of the published cases the polyuria might have been hysterical in character; in a certain proportion of the cases this symptom is recovered from after a wonderfully brief period of hospital treatment.

W. G. S.

CAMILL HIRSCH (Prague). **Investigations on Pigmentation of the Retina.** Berlin: S. Karger, 1905.

IN his investigations on pigmentation of the retina, the results of which are published in this brochure of 88 pages, Hirsch studied a number of cases of partial degeneration of the retina occurring in eyes which had received various forms of injury. A comparison of his clinical and anatomical results with those obtained previously by experiment on animals and with the literature of pigmentation of the retina more especially throws a new light on traumatic lesions of the pigment epithelium and "rupture of the choroid," as well as on the pathogenesis and etiology of typical retinitis pigmentosa.

The following are some of the more important results of this investigation so far as concerns the pathology of the pigment epithelium in man:—

1. The pigment epithelium of the retina is nourished by the chorio-capillaris, and the neuro-epithelium receives its nutrition from the same source.
2. Every disturbance of the circulation in the chorio-capillaris interferes with the nutrition of the pigment epithelium, with resulting degeneration and its consequences.

The effect of this disturbance of the circulation is different according to whether, on the one hand, it comes on *suddenly* and is complete, or there is, on the other, only a diminution of the blood supply which *gradually* progresses and finally ends in cessation of the flow. (*a*) In the first case there is complete degeneration of the pigment epithelium which lies upon the part of the choroid where the circulation has ceased. The degeneration extends rapidly to the other layers of the retina, in diminishing intensity, as far as the nerve fibre layer. The products of disintegration of the pigment epithelium cells penetrate into the meshes of the degenerated retina and spread along the blood vessels. The vessels themselves remain normal. The picture of *acute pigment degeneration* of the retina is presented. Wagenmann has produced experimentally such a degeneration by dividing the posterior ciliary arteries in rabbits. Hirsch finds from anatomical examination that in man laceration of these vessels produces an analogous histological appearance in the retina. (*b*) In the second case degeneration of the pigment epithelial cells occurs simultaneously with the slowly diminishing blood supply. The pigment epithelium loses its pigment before the altered nutrition has produced marked atrophy even of the outer retinal layers. The pigment of the dead cells is carried away, as the conditions necessary for its penetration into the cells, viz., considerable atrophy of the same, are not present. Senile sclerosis of the choroidal vessels is an example of this. The result is shown in the retina principally by atrophy of the pigment epithelium. Only very scanty remains of it enter the retina itself.

3. Circulatory disturbance in the retinal vessels is usually without influence on the normal condition of the pigment epithelium (*e.g.*, embolus of the central artery). By a sudden *complete* and permanent emptying of a retinal vessel, however, degeneration may extend from the nerve fibre layer outwards over the whole thickness of the retina, including the pigment epithelium. An example of this is a partial pigmentation resulting from severance of a retinal vessel by a foreign body (writer's cases 4 and 5).

4. For the production of the appearances seen in typical "retinitis pigmentosa," disease of the retinal vessels, as well as of the choroidal, is necessary. Excessive development of one or the other of these two factors, failure or slight development

of one of them, prevents the typical picture of the disease, and "anomalous forms" result.

All investigators of typical retinitis pigmentosa found changes in the central artery of the optic nerve similar to those in the vessels of the retina and choroid. But whether the ophthalmic artery is similarly diseased, or whether the change can be followed to its branches has hitherto not eben determined.

5. There is reason to think that in typical retinitis pigmentosa there is a general disease of the vessel walls, the disposition to which is probably inherited, and which sometimes specially, or even exclusively, affects the ophthalmic artery. It is not yet certain what is the nature of this disease of the vessels which has been designated sclerosis or hyaline degeneration of the vessel wall and occasionally perivasculitis. It is hereditary and occurs in families, it comes on early and has a very chronic course. Syphilitic disease of the vessel walls and senile degeneration of the vessels may occasionally produce a wholly analogous appearance, although there are always differences from typical retinitis pigmentosa as regards onset and course.

6. The pigment epithelium may also become altered without disturbance of the choroidal circulation: by being raised from its underlying nutrient layer, by chemical influences, and by direct injury. In these cases the retinal atrophy is not nearly so marked as in those with sudden disturbance of the choroidal circulation, yet it is sufficient to allow penetration of free and proliferating pigment into the layers of the retina.

7. The pigment epithelial layer may alone be torn by a contusion of the eyeball. When at the same time the lamina vitrea is torn the typical "choroidal rupture" is produced. The white streak seen in ruptured choroid is not due to exposed sclerotic seen through the gaping fissure. It is rather the raised lamina vitrea itself which becomes visible and, by reflexion and irregular refraction, prevents the choroid being seen. The bright red margin of the "rent" seen at first, corresponds to the actual lamina dehiscence, over which the pigment epithelium, though in continuity, is uneven, raised, and microscopically altered.

C. H. U.

N. B. Harman (London). **The Conjunctiva in Health and Disease.** London: Baillière, Tindall and Cox, 1905.

This book of about 250 pages forms, as the author says,a record of some research work; it deserves the attention of every ophthalmic surgeon. Of recent years the changes in our manner of classifying, diagnosing, and treating diseases of the conjunctiva have been greater than in regard to maladies of any other part of the eye. "Conjunctivitis" as a diagnosis is no longer sufficient, and quite different remedies have been found to be suited to different forms and groups. There is always among us a tendency to imagine that we have now at last reached the point towards which we have been striving, and to think that we now at all events know all that is to be known about a subject. Assuredly, though on a very superficial examination of such book as this such might be the impression, closer examination ought to correct it, for it is clear that we are not in a position at all times even yet to decide from clinical appearances which of several organisms may be present in any given case of conjunctivitis, and why apparently the same organism can in different individuals give rise to reactions which differ so markedly.

In Mr. Harman's book the state of the conjunctiva is dealt with as it is in health, in disease, and sociologically with reference to the incidence of disease at various ages, and at different seasons of the year, in various social positions. In the course of the work, of which his treatise is the record, Mr. Harman has not spared labour; he has examined and noted the condition of children in a number of elementary schools, statistics of various hospitals (*e.g.*, case incidence at Moorfields for 1902 per 100,000 of population), compiled numberless statistics of his own (some of them, one would think, certainly not worth the trouble expended), done a vast deal of laboratory work, etc., etc. Some of his chapters are much more interesting than others, one of the best in this respect being that dealing with membrane on or of the conjunctiva; as a name for the condition in which this formation takes place he suggests "conjunctivitis necrotica superficialis" (or profunda, as the case may be), in order that one may not use a term which predicates more than one is in a position to assert. The section on trachoma is also of interest, but with his conclusion that this is an attenuated and altered form of gonorrhœal conjunctivitis we do not see our way for a moment to agree.

We are pleased to notice that the author does not find himself carried away by the praise, sometimes unwise, sometimes unreasonable, sometimes interested, of the newer preparations of silver, but for many conditions, at all events, prefers the old-fashioned nitrate. His experience of radium and the X-rays in trachoma is not encouraging, and he places much less value upon jequirity than some surgeons of much experience are inclined to do.

Mr. Harman has read the older authors with much care and appreciation, but his quotations from them are sometimes dragged in in a somewhat inconsequent manner. He is not always quite accurate in regard to names, and has allowed one or two other errors to creep in; for example, he twice uses the word "bi-weekly" when he means twice a week.

Altogether, however, the work done and the book of which, and of the thoughtful and intelligent consideration of which, it is a record, are very creditable to the author.

L. Golovine (Odessa). **Cytotoxines and Sympathetic Ophthalmia.** *Archives d'Ophtalmologie*, February, 1905.

The true origin of sympathetic ophthalmia is still shrouded in mystery, and recent research has not apparently brought us much nearer to the solution of the difficulty. Two points of uncertainty meet one at the very outset of an enquiry into the subject:—What is the evil influence which passes from one eye to the other, and By what path is it conveyed, whatever it may be? To take the second point first, it is difficult to imagine any other path than either optic nerve or by way of the circulation; the theory of the ciliary nerve route probably has this importance, that by diminishing the resistance of the eye irritation of the ciliary nerves affords facilities for the injurious action of the noxious agents which have travelled by some other path. As regards the first question, the material or influence itself, there are three explanations, viz., (1) the migration theory, which requires a passage of the organisms themselves from eye to eye by way of the lymphatics of the optic nerves, *viâ* the chiasma. This theory, at first received with approval, has lost ground in the opinion of most, not only on account of the difficulties inherent in it, but because its postulates have not, upon more searching examination, been found to be sound. It has therefore been modified, and appears as (2) the bacterio-toxic theory, in which the organisms themselves are not supposed to travel from eye to eye, but their toxins do. This theory, too, has been tried and found wanting; there are grave reasons to doubt whether it is the case that the toxins do so pass, and even if they do, this will not explain certain of the facts. There remains then (3) the theory of metastasis, which is warmly supported by some of those best qualified to judge. It has two serious difficulties to overcome. In the first place, if there are such organisms in the circulation why do they remain quiescent so long and then break out into activity, and if they are capable of doing so much, so very much, harm, why do they remain without producing any evil effects save in the eye alone. It is quite true that even virulent organisms may remain in the circulation for some time before giving rise to symptoms, but in regard to the eyes this is not a question of days and weeks, it is sometimes a matter of years. For example, the reviewer knows of an instance in which the patient first had symptoms of sympathetic trouble forty-three years after the injury of the first eye. To get rid of the second difficulty one has to postulate that these hypothetical micro-organisms have a specific action on the eye alone, and Raehlmann imagined that he had succeeded in recognising the special organisms in the vitreous humour, but his results are unsupported.

For the sake of clearness in regard to Golovine's own views, it is convenient to give the above very brief résumé of the condition of our knowledge, before setting forth the opinions put forward by him. His suggestion is that in an eye attacked by this particular form of inflammation, especially in the ciliary region, there is brought about, it may be by the action of organisms, it may be apart from them, a destruction of ciliary cells whose absorption gives rise to the formation of cytotoxins in the system. Under certain conditions these cytotoxins may pass into the circulation and so to the other eye where they are capable of setting up a precisely similar process in the corresponding ciliary region of it in its turn. It is not impossible that to this inflammatory process such organisms as were in the blood would also contribute, but their rôle, if any, must be a subsidiary one. There is nothing impossible, Golovine thinks, in this suggestion, particularly in view of what takes place in regard to other organs and other toxins,—take, for example, the nephrolysines.

In pursuance of his theory he proceeded to endeavour to cause the production in the actual animal organism cellular poisons whose action would be specific for the ciliary body,—to cause heterotoxines to be elaborated by animals of one species which should be specific for animals of another. In the peritoneal cavity of the rabbit he has also made injections of an emulsion made from the ciliary body and iris of the dog. Then the serum from rabbits which had received at certain intervals a series of injections has been introduced into the anterior or the vitreous chambers of dogs, as well as into the general circulation. In all these experiments it is unnecessary to say, careful asepsis have been observed and controls employed. The results of these experiments have, he says, entirely confirmed his expectations. When the cytotoxic serum is injected into the eye the same clinical picture is always presented—slight accesses of irritation, not purulent; slight circumcorneal injection; numerous small deposits on the posterior surface of the cornea as in keratitis punctata; fibrinous exudation into the anterior chamber; and iritis. When but one injection has been made the inflammation is not severe, and is of short duration. Microscopic examination of eyes enucleated from three to five days after the injections have been begun showed a sero-fibrinous exudation into the anterior chamber containing phagocytes replete with pigment granules; inflammation of the iris; infiltration of the ligamentum pectinatum; fibrinous exudation into the ciliary body, in which pigment-bearing leucocytes are embedded. The cells of the ciliary body were swollen, their nuclei atrophied and often vacuolated.

When the cytotoxic serum is injected into the general circulation only no ocular changes occur, visible to the naked eye, but with the microscope the following conditions become manifest, which are confined to the ciliary body:—Fibrinous exudation under the epithelium; swelling of the epithelial cells, and vacuole formation in their nuclei; intense depigmentation of the pigmentary layer, the colouring matter from which entirely disappears from many of the cells and travels to those of the normally non-pigmented pars ciliaris retinæ.

Golovine has not as yet been able to carry his work further than this point, and proposes to address himself now to the further study of his cytotoxine and to the special conditions under which it is evolved in the living organism in the form of an autotoxin; but if he is right in his views this may possibly give us a clue not merely to the pathology but to the cure of the dreaded sympathetic ophthalmia. He proposes to name "cyclotoxin" the toxin which is thus capable of evolution by the animal, which can be contained in its serum, and which is specific for the non-pigmented epithelium of the ciliary body. He believes that he has sufficient evidence also of the existence of another toxine which he calls "pigmentolysin," which produces lesions of the pigmentary layer, characterised by the destruction of the colouring matter. The fact that the emulsion employed in the injections contains a considerable amount of debris of pigment cells seems to indicate the origin of this poison.

While in one sense the chief interest of his conclusions is connected with sympathetic ophthalmia, Golovine is careful to point out that his results have important bearings also on other affections, such as certain forms of choroiditis, and serous iritis, while the existence of the pigment-destroying toxin touches general pathology in many aspects, and he suggests that indirectly it may lead to some modifications in the treatment of retinitis pigmentosa.

These poisons may be constantly present in the body, and only become active in the (so to speak) temporary absence or enfeeblement of the antitoxin which must also be normally present, and it may be in this way that we are to understand the meaning of the vague term dyscrasia, and the reason for the appearance of non-bacterial diseases under various depressing conditions. And, further, if there be such toxines and antitoxines having relation to the ciliary body, may there not be others whose sphere of action is the lens, the retina, and what not? The advance of the science of pathology may lead us in these directions, says Golovine, and while bacteriology has an importance which it is difficult to overestimate, there appear to be regions which do not own its sway.

W. G. S.

Bumke (Freiburg). **Pupillary Disturbances in Mental and Nervous Diseases.** Jena: Fischer, 1904.

This treatise, as its title implies, is written from the point of view of the physician, and does not concern itself at all with diseases confined to the eye. Nevertheless much of interest to the ophthalmic surgeon will be found in it, and this is especially true of the first part of the book dealing with the physiology of the pupil. Some of these points will be referred to now.

It was asserted by Weber that the direct and consensual reaction to light are necessarily equal, so that a physiological inequality of the two pupils due to a difference in illumination would be an impossibility. Clinically, however, this is found not to be invariably true, and Fuchs, using the photographic method, has recently found that in a minority of cases the direct reaction to light is slightly greater than the consensual. The matter has also been investigated by means of a galvanic current of between $^1/_{50}$ and $^1/_5$ milliampère. One electrode is applied to the sternum and another held by the patient to his temple. A current of a certain strength is able to evoke a sensation of light in the eye on the same side. A somewhat stronger current evokes a contraction of the pupils, and by this method, too, it is found that the direct and consensual reactions are not invariably equal.

Another point fully discussed is the effect of the adaptation of the retina to light on the reflex action of the pupil. Under the heading simultaneous actions *(Mitbewegungen)* come the contractions of the pupil which accompany accommodation or convergence, and also the "orbicularis phenomenon," the contraction with forcible closure of the lids, a phenomenon first systematically studied by Westphal and by Piltz, working separately, in 1899. If the lids are forcibly closed and the light then altered from very bright to very dim, immediately on opening the lids, instead of a contraction, a dilatation will be observed. The phenomenon may also be observed as the result of a reflex contraction of the orbicularis due to stimulation of the fifth nerve, and hence the apparently contradictory statements that have been made about the influence of the 5th nerve on the pupil. Ordinarily, like sensory nerves all over the body, its stimulation causes a reflex dilatation of the pupil, but sometimes this tendency may be counteracted owing to the orbicularis phenomenon.

With regard to sensory stimulation in general, and its effect in causing reflex dilatation of the pupil, it used to be taught that this was due to the action of the sympathetic. The dilating fibres of the iris undoubtedly exist, and they are supplied by the sympathetic, but their action is exceedingly slight, and serves rather as a damper than as an effective antagonist to the action of the sphincter; whereas normally, a contraction to light is quickly followed by a secondary dilatation, with paralysis of the sympathetic this secondary action is delayed. The action of the sympathetic is to produce a slight relative dilatation, but that of sensory stimuli is far more powerful, and would appear to be effected through a direct influence of an inhibitory nature on the centre for the third nerve, an influence which is effective during the absence or paralysis of the sympathetic. Nor is this inhibitory influence always only reflex. It appears that it may proceed direct from the cerebral cortex. Indeed, if the finest movements of all are observed, it is maintained that no psychic action, whether emotional or intellectual, can take place without an accompanying tendency to dilate the pupil. Consequently the normal pupil is never at rest during our waking hours, but is continually subject to fine oscillations depending on the stimuli to our senses from without on the one hand, and on changes taking place in the cerebral cortex on the other.

Hence it happens that during sleep, in spite of the absence of light, the pupils are small. In a condition of exhaustion, on the other hand, *e.g.*, after a sleepless night, they are usually wide. Apparently the reaction to the dilating stimuli is less impaired than the reaction to light, a conclusion which is surprising, but which the author came to after experiments on night watchers conducted with a weak galvanic current to one eye, the consensual reaction of the other being observed. How he differentiated between the effect of the light sensation produced and the sensory stimulation through the skin of the eyelid is not stated, and on the face of it a more likely reason for wide pupils in exhaustion would appear to be some inhibitory impulse proceeding from the cortex of the brain.

The second part deals with the general pathology of pupillary abnormalities apart from intraocular or congenital affection. There are three conditions which have to be distinguished:

1. Incapacity of the retina to receive impulses which normally give rise to pupillary contraction (*Reflextaubheit*—deafness to the message from without); this condition, of course, goes along with retinal or optic nerve blindness, but the extent to which the two apparatus are affected is not necessarily the same. Affections of the outer layers of the retina leave the pupillary fibres relatively intact; those of the inner layers necessarily involve them. Under this head comes the consideration of the

hemianopic pupillary reaction, the existence of which cannot be doubted, though its value in diagnosis is diminished by the impossibility of preventing the diffusion of light by the intraocular media, so that the apparent loss of light reflex on one side can never be more than comparative.

2. Secondly, with the visual apparatus and the centripetal and centrifugal paths to the pupil all intact, the reflex apparatus may alone be damaged—the Argyll-Robertson phenomenon. The mark of this is not necessarily a complete loss of the reflex, but rather a relative diminution compared with the action to convergence. If both actions are alike impaired we have to do not with a defect in the reflex mechanism but more probably in one of the centrifugal apparatus. The occasional occurrence of the Argyll-Robertson phenomenon on one side alone makes it possible to devise various theoretical schemes of the course of the pupillary fibres. It is of more practical importance to note that in this class of cases the simultaneous actions of the pupil are retained—not only with convergence and accommodation, but also with the closure of the lids, while not only the reflex contraction to light, but also the reflex dilatation to sensory stimuli, is as a rule defective.

3. Thirdly, centrifugal influences may affect the pupil, the motor apparatus may be damaged by affections of the third nerve or nucleus, or by either an exaggeration or diminution of the inhibitory influences proceeding from the cerebral cortex or reflexly from the sensory nerves.

An interesting section concerns the importance of inequality of the pupils as a symptom. Their size is influenced by so many different factors that slight functional disturbances of the nervous system may suffice to cause slight inequality. Great inequality, however, is, as a rule, the sign of organic mischief. "Alternating mydriasis" has been observed in neurasthenia and hysteria.[1]

After the first two parts of the book we have two chapters, the first on methods of investigating the pupil, the second on the anatomical course of the pupillary fibres. In order to observe the fine oscillations of the pupil the author employs a corneal microscope described by Laqueur[2] with which a dim light is all that is necessary to observe movements of $\frac{1}{4}$ m.m.

The third part of the book deals with special pathology. In it tabes occupies a foremost place. Besides the causation of the Argyll-Robertson pupil the question is discussed why there is so often miosis. Formerly it was put down to a diminished innervation of the sympathetic, but the interference with the sensory paths which normally convey impulses causing reflex dilatation—or with the reflex mechanism of dilatation,—is a more probable explanation, at any rate in cases in which the light reflex is retained. When it is absent and the miosis still present it seems hardly a sufficient explanation. Nor is the hypothesis of spasm or secondary contracture of the sphincter—seeing that it still acts to accommodation,—satisfactory. As to diagnosis, the Argyll-Robertson pupil is said to be as characteristic of general paralysis as it is of tabes, and it may also occur in the course of cerebral syphilis but here it is usually unilateral and combined with other symptoms of a local lesion.

The mechanism by which the reflex action of the pupil to light is maintained is situated in a well-defined and strictly circumscribed region of the brain, whence it comes that interference with this mechanism is a very definite and diagnostically important symptom. It is otherwise with interferences with the dilating mechanism, whether by way of exaggeration or depression, for these may proceed from any part of the cortex and may be caused either by the most trivial functional disturbance or the gravest organic disease. Moreover, there is probably a special area of the cortex in man, as there is in animals, stimulation of which causes, not dilatation, but contraction. Where this region is, however, in man is at present unknown. The consequence is that while pupillary symptoms often point sharply to disease within the skull either organic or functional, it is seldom possible to draw inferences as to the seat or nature of the disease from these alone.

Pathologically the influence of the cortex is most often seen as a cramp causing wide pupils, partially or completely inactive to both light and convergence. This is seen in meningitis, chloroform narcosis, during an epileptic seizure and also in hysteria. That there should be any pupillary symptoms in hysteria would have seemed a contradiction in terms not many years ago. The difference between wide pupils due to emotional disturbance and pupils inactive to light has generally been considered a difference in kind, but according to modern authorities it is only one of degree. Thus in a subject of melancholia, during great emotional strain, the pupils were observed to be inactive to light—and other similar observations have been made by authorities whom the author considers as incontestable. Again, in the mental condition known as "dementia præcox[2]" sensory stimuli which normally dilate the pupil are unable to do so.

Perhaps enough has been said to indicate the scope of the book. It is probably as satisfactory an account of its subject as the present state of our knowledge allows, and more complete than any that exists in the English language.

A. H. T.

[1] *cf.* the March number of the *Ophthalmic Review*, p. 77.

[2] *Klin. Monattsblätter f. Augenheilk.*, 1887, pp. 465, 496.

THE
OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

The President, Mr. John Tweedy, in the Chair.

Meeting held May 4th, 1905.

Cases and Card Specimens.

Gumma of Sclerotic and Episcleral Tissues.—Mr. J. Jameson Evans.

Mr. Evans showed the left eye of a man aged 45, which had been enucleated on account of pain, extreme congestion with œdema of the eyelids and chemosis. A sharply-defined detachment could be made out while the eye was *in situ*, in the upper and outer quadrant of the fundus. The tension had been +2. Microscopical sections showed a fleshy mass adherent to the posterior part of the sclera, the cornea normal, iris thickened, with the ciliary processes densely infiltrated with round cells and extravasations of blood, the retina swollen and its vessels engorged and in part detached by fibro-cellular infiltration. The choroid appeared infiltrated by round cells, and the choroidal vessels were also engorged. The sclerotic was softened, gelatinous, and infiltrated with round cells, and at one spot a homogenous patch—apparently necrotic—encroached on the choroid. The large mass in the episcleral tissue consisted of very vascular round-celled tissue, the cells becoming spindle-shaped posteriorly.

Intra-ocular Swelling (? Inflammatory) Associated with Pigmentary Changes in the Retina.—Mr. G. W. Thompson.

The patient, a woman aged 39 years, showed in the right eye fine dust-like opacities in the vitreous and a conical elevation of the retina in the lower half of the fundus, the summit of the elevation being best seen with a +10D lens. The sides of the elevation were steep, particularly the upper, temporal, and nasal, while below the steepness gave way to a shallow detachment at the periphery. The raised portion of the retina remained transparent, and appeared to be pushed forward by some solid sub-retinal structure which appeared translucent, though no choroidal vessels could be made out through it. Three patches of pigment were present on the cone, and much pigment in bone corpuscle-shaped patches was present in other parts of the fundus; no patches of atrophy of the choroid could be seen, and the pigment was confined to the lower portion of the fundus. The field of vision was much contracted, forming a circular area below the horizontal plane. There was marked specific history, and the case was accordingly under anti-specific treatment.

Enophthalmos with Changes in the Frontal Nerve Area.—Mr. Cyril H. Walker.

The patient, a man aged 27, a worker in moulding and planing mills, had found that his right eye was sinking into the socket; he gave no history of alcoholism, specific symptoms, or of any injury, and since ten years of age had never missed a day's work through illness. The right eye showed marked enophthalmos, the globe having receded about $\frac{1}{4}$ of an inch, without, however, the movements of the globe or eyelids being in any way affected. The inner half of the right upper lid and corresponding portion of the eyebrow appeared atrophied, and were quite destitute of eyelashes and eyebrows, while some atrophy of the tissues of the forehead caused a depression which led upwards to a bald depressed patch on his scalp extending up to a point close to the vertex, this patch was depressed, 4 inches long by $\frac{3}{4}$ of an inch in width, and resembled the scar of a severe head injury, all the tissues being involved, including the underlying bone. The atrophied patch corresponded to the distribution of the frontal nerve. The lachrymal and nasal branches, however, of the ophthalmic nerve appeared in no way affected. Sensation and movement of the scalp in the affected area were not impaired. Some six years before, a hairdresser drew the patient's attention to the bald patch, immediately after which it was noticed that the eye was sinking in, and this had been accompanied by severe frontal headache, also at times by a thick mucoid discharge from the right nostril. Both corneæ showed nebulæ, and there were some posterior synechiæ in the right eye. Two other cases were mentioned as having been reported, one by Gulland in the *Edinburgh Hospital Reports*, Vol. i., p. 384, the other by Collins in the *British Medical Journal*, 1899, Vol. ii., p. 846.

A Case of Oxycephaly.—Mr. Leslie Paton.

The patient, a female aged 31 years, showed a very marked prominence of the skull in the frontal region, in shape and size like a large orange, also much proptosis and divergence of both eyes, the right being completely blind, while the left had vision of Jg. 20. The pupils were unequal, and barely reacted to light, though they reacted well on convergence. The patient stated that she had become blind of the right eye when nine years of age, and that the sight of the left had diminished during the last 12 months. Ophthalmoscopically the right optic disc showed sharp edges, was of a pale bluish-white colour with a grey white filling in of the central cup, and was surrounded by a pinkish-brown zone with the outer margin pigmented. The vessels were of normal size. The left disc appeared to be very white with a bluish-white central cup and normal sized vessels. A small irregular patch of pigment covered the vessels below and on the inner side of the disc, and the choroid in this and in the other eye was thinner than normal. The right eye was myopic to about 10 dioptres, but the left only to the extent of one dioptre.

Coloboma of Upper Eyelid with peculiar Thickening of the Conjunctiva on its inner surface.—Mr. E. Treacher Collins.

The patient, a man aged 17, attended Moorfields Hospital for the first time in February of this year with a growth on his right eye, which, together with a notch at the border of his left upper eyelid he said had been present since birth. At the lower and outer margin of the right cornea was an oval shaped dermoid with hairs springing from it. Also at the junction of the middle and inner thirds of the left upper eyelid was a small indentation, and corresponding to the position of this indentation but on the inner surface of the upper lid was a line of thickened conjunctiva running in the direction from before backwards, and resembling very closely a cicatrix left by a wound which had involved the conjunctiva and tarsus; the patient, however, was quite certain that he had never received any injury, and that the condition had been present at birth. This seemed the more likely in presence of the other congenital defect, viz.. the dermoid in the other eye. The dermoid had been removed, some granulations had formed and had become organized into a pinkish-grey pedunculated protruberance which was still present.

Specimen of an Eye which had been Couched and subsequently Excised.

Mr. J. B. Story.

The couching had been done by an unqualified man who styled himself "The East Indian Janinny Oculist," and who had advertised himself largely in Ireland by the name of Mastakeem Hakeem. The specimen was the eye of a woman aged about 50 years, which had been examined some six years ago by Mr. Story, and at that time had an immature cataract. A year after this the Indian had operated, and the woman stated that immediately after the operation she "had sight" for a moment, but after the application of a poultice of white of egg the sight had been lost. The specimen showed a shrunken globe, which in all probability had been lost from irido-cyclitis after the couching.

Anterior Synechia of the Pupillary Membrane.—Dr. Arthur J. Ballantyne.

This was a description of the microscopical appearances of the eyes of a fœtus of seven or eight months, which had been removed *post-mortem* and enclosed in the uterus. The cornea was unchanged, Bowman's and Descemet's membranes being intact, the anterior chamber was in part filled with a homogenous coagulum, the ciliary processes were closely in contact with the lens, the retina and choroid were normal, and the hexagonal pigment cells well developed and pigmented, while the choroid was free of pigment. The retina and choroid were separated by a layer of homogenous coagulum similar to that in the anterior chamber. The vitreous contained portions of patent blood-vessels, some lying immediately behind the posterior pole of the lens, while other branches passed along the posterior capsule towards the equator of the lens. The pupillary membrane consisted of a fine, almost structureless membrane containing numerous small grains of brown pigment, and having on its anterior surface a number of thin-walled blood-vessels filled with blood. The membrane took its origin from the anterior surface of the iris, a short distance from its pupillary margin. The iris stroma contained little pigment, but the posterior pigment epithelial layer of the iris was well pigmented and consisted of two distinct layers of pigment cells. Sections across the anterior chamber showed the pupillary membrane stretching across from one iris border to the other in parts, in other parts stretching across but adherent also to the lens capsule, and still in other parts adherent to the back of the cornea. At the points where the membrane was adherent to the back of the cornea, iris and lens, the endothelium was absent, but Descemet's membrane—in the case of the cornea—remained intact, from which it was inferred that the adhesion had taken place subsequently to the formation of the anterior chamber, but there was a total absence of signs of inflammation in the cornea, iris or ciliary body, and no anterior polar cataract. A resumé of fourteen recorded cases was given, but in only two of the latter were anatomical examinations made, one recorded by Wintersteiner, the other by Collins, in no other instance had the condition been observed pre-natally. To account for the adhesions between the remains of the pupillary membrane and the cornea two explanations were given, the first based on the fact that in the embryo the undifferentiated mesoblast lying between the lens and the ectoderm splits into two layers, the anterior forming the substantia propria of the cornea, the posterior forming the stroma of the iris and pupillary membrane, while the cleft between the two represents the future anterior chamber. Owing to some defect in development the complete separation of the two layers becomes interrupted, which resulted in the pupillary membrane, or iris, remaining adherent to the cornea. The second—which is supported by a greater volume of clinical and pathological evidence—is that owing to some keratitis, with or without perforation of the cornea, inflammatory adhesion takes place between the posterior surface of the cornea and the persistent remains of the pupillary membrane. The writer's explanation of the present case was, that at some period of fœtal life, while the iris and pupillary membrane were still in contact with the cornea, some inflammatory process occurred which involved the structures forming the walls of the anterior chamber, and led to the destruction of certain points of the endothelium, upon which the iris and pupillary membrane came into direct contact with the denuded Descemet's membrane and became adherent thereto. In many of the other recorded cases a distinct history of inflammation of the eye previous to the condition having been observed, was obtainable. Lantern slides of the preparations were shown and a very complete list of recorded cases presented.

Bjerrum's Method of Testing the Field of Vision.—Dr Arthur Sinclair.

Dr. Sinclair's, paper had special reference to the value of this method of examination in the diagnosis of glaucoma. When this method is employed the field is first taken with the ordinary perimeter, and afterwards with Bjerrum's screen and test-objects.

The screen is made of black velvet, and is marked out with fine black thread in radiating and concentric lines. The screen is about two metres in diameter, is suspended vertically when in use, and should be used in good daylight. The test-objects are of white ivory, and vary in diameter from 1 to 20 mm. A long slender black rod is used to move the test-object over the surface of the screen. The patient is placed at one or at two metres from the centre of the screen. The field is recorded on the screen with black pins and is transferred to a chart.

The advantages of this method depend chiefly on the adaptation of the test to the region of the retina under examination. For example, the field for a test which subtends a visual angle of 2′ extends to about 26° from the fixation point in the normal eye, the field gradually extending with the larger sized test-objects till the limit is reached with a test subtending an angle of 30′.

Clinically this method affords a delicate means of testing the integrity of vision over the more central portions of the field, and of demonstrating minor or relative defects within the perimetric limits. In glaucoma such relative defects are of characteristic form, and appear earlier in the course of the disease than loss of central vision or restriction of the periphery of the field.

Lantern slides were shewn demonstrating the distinctive character of the field in glaucoma and how by this method it may be readily distinguished from optic atrophy.

A series of glaucoma charts were shewn, taken at intervals of from six weeks to five years, indicating the permanent nature of the glaucoma symptom, and shewing how occasionally it may become modified with time.

Charts were shewn where the screen test demonstrated the presence of glaucoma before the periphery of the field or central vision gave any indication. Other examples of characteristic changes in glaucoma fields were shewn and discussed.

Notes on a Case of Pulsating Exophthalmos cured by Ligature of the Common Carotid.—Mr. S. Johnson Taylor.

The patient, a married woman, aged 55, had been seen for the first time four years ago, with a marked degree of proptosis of the right eye, accompanied by much swelling of the lids, great chemosis of the conjunctiva which protruded from between the lids, immovable globe and dilated pupil insensitive to light, full tension and hazy cornea with some ulceration in its upper and outer quadrant. At first sight the case looked very like one of orbital cellulitis. Seven weeks previously the patient had fallen down some steps, breaking her collar-bone and striking the left temporal-parietal region of her head against the stone floor; this caused her to lose consciousness, and on recovering she noticed an intermittent blowing noise in her head which had continued ever since. This pulsation could be felt on placing the fingers on the proptosed eyeball. Four weeks after the injury the right eye had become inflamed and begun to project. The patient was kept in bed for a week with the eye padded up under pressure, fluids were limited and Pot: Iod: given internally, but the swelling of the lids and proptosis increased, the ornea became ulcerated, and in addition severe neuralgic pains destroyed the patient's rest. A systolic bruit could be distinctly heard with the stethoscope over the side of the head. Ligature of the right common carotid was performed, the artery being tied above the omo-hyoid which resulted in the immediate cessation of the bruit. The proptosis and swelling of the lide, however, remained for some considerable time after the operation, but five months later it had quite disappeared, leaving some slight swelling of the lids and a granular condition of the conjunctiva. The eyeball was freely movable, the pupil immobile, the optic disc pale and atrophied with contracted vessels. At the present time, four years afterwards, no relapse has taken place, but the vision of the eye remains very defective, and the writer considered that this might fairly be said to be a complete cure.

Papers were also read by Dr. Leslie Buchanan on (*a*) "Choroiditis" and (*b*) "Results of birth injury to the cornea," and by Dr. Hancock on "Congenital opacities of the cornea."

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A CASE OF ACROMEGALY.

By Richard Kerry, M.D., etc.,
Oculist to the Montreal Dispensary.

Several years ago a gentleman, 50 years of age, came to me for consultation as to the condition of his eyes, stating that he had suffered for some years from rheumatism and from intense headache. His eyes had been examined two years previously, and "optic atrophy" due to rheumatism diagnosed, a very unfavourable prognosis being given. After a sojourn at a mineral spring he returned, however, with his sight, according to his own statement, fully restored.

Examination revealed marked atrophy of the left disc, the function of the eye being reduced to bare perception of light with the temporal half of the retina. The right disc was also atrophic in appearance, though to a much less degree than the left one; the vision with correction was one-third of normal; the field for white was normal, so were the fields for red and for blue; green was not distinguished. At a subsequent examination the right field was found contracted, especially on the temporal side.

The appearance of the patient was such as to arrest immediate attention, the face being out of all proportion, and seeming too large for the bones which supported it, the effect being decidedly grotesque. The head was thrust forward, the shoulders being very much rounded. The movements were slow and deliberate, but not altogether awkward. He had a peculiar dull, listless air, and although intelligence was not impaired, cerebration was delayed, and both animation and emotion were largely in abeyance. There was evidence of marked tissue change in different parts of the body, the head and face being broad and massive, the cartilages of the nose enlarged and very wide, the lips thick, the lower one being pendulous. The tongue, uvula and pillars of the fauces were also enlarged, so much so as to render the examination of the post-nasal space (for evidence of empyæma of the sphenoidal sinus) very difficult. There was marked kyphosis in the upper dorsal region, the sternum was wide and thick, the abdomen round and protuberant, recalling the condition found in cretins. The hands and feet were much enlarged and spade-like, the fingers being if anything thicker at the end than at the first joint; the pad of tissue over the hypothenar eminence was fully one inch and a half in thickness. The genitals were not affected. Generally speaking, the case was characterised by an absence of marked change in the osseous system. These considerations, more particularly the ocular condition, even though this was atypical, the tissue change and the intense headache indicated a diagnosis of acromegaly.

In considering treatment one would naturally think of pituitary gland substance as a remedy, but as the patient's physician had a short time previously placed him upon thyroid treatment, which was followed by marked improvement, and as the published reports upon the remedial action of the pituitary gland and of its various preparations are upon the whole unsatisfactory, this course was not recommended. Under the treatment followed the patient rapidly lost weight, and was almost completely relieved of his intense headaches.

Shortly afterwards the patient proceeded to Berlin, where the diagnosis of acromegaly was confirmed. He was given tablets of pituitary substance, and a bottle of liquid—iodothyrin, possibly—to be taken alternately a month each, for six months.

A few months previous to the patient's visit to me his son, a lad of tender years, was murdered and mutilated in a most shocking manner by a half-witted emigrant, who was wandering about the streets in the suburb where the lad lived. This sad accident was probably the cause of the recurrence of the symptoms with such severity, and of the rapid progress of the disease.

At the present time the condition of the patient shows but little change, saving that he has lost the use of the right eye completely. The treatment which he followed resulted in a considerable loss of weight and general quickening of the faculties up to a certain point, beyond which no progress was made.

A study of the pathological changes present in acromegaly inclines one to sum up the net result in the word "confusion." Practically every tissue in the body undergoes more or less important change; but the lesions present in different cases are so diverse that the possibility of variation in the ætiological factors is at once suggested, and the question as to whether we are dealing with a nosological entity or with a group of allied affections arises. Increase in the amount of blood in the body, which, from the large amount which is found *post-mortem*, is stated by some authorities to be present, and the rare condition of true hypertrophy of glandular tissues which is also found, may be the direct causes of some of the tissue change, and probably exert a powerful influence upon trophic processes.

Marie, who first called attention to the change produced in the hypophysis cerebri in acromegaly, held that this change was due to alteration in the sympathetic system; and in this connection it is interesting to note that Berkley (*Brain*, Vol. xvii.), in his paper on the anatomy of the infundibular region, states that sympathetic fibres only are present in the pituitary body. But whether the changes in the hypophysis depend upon deeper-seated causes, as, for instance, degeneration of nerve tissue, which is found to such an extent affecting the spinal cord in some cases, or whether the reverse be true, there seems to be little doubt but that interference with the hypophysis is the direct cause of many changes present. A study of cases of sarcoma of the gland and of acromegaly without tumour of the gland, speaks wholly for the interference of function of the gland being responsible for all changes, except those which are produced by direct pressure of the enlarged gland.

In 210 cases reported by Sternberg ("Die Akromegalie," *Nothnagel's System of Medicine*) there was hypertrophy in nearly every case, while degenerative changes were present in the balance. An examination of reported cases affords the following varieties:—

1. Simple hypertrophy of the gland with acromegaly.
2. Sarcoma of the gland with acromegaly.
3. Sarcoma of the gland without acromegaly.
4. Acromegaly without tumour of the gland.

The first class comprises those cases which run in the main a chronic course, lasting sometimes so long as fifty years, and terminating in death from interference with nutrition or, not uncommonly, from intercurrent disease.

The second and third class run an acute course; the explanation of the absence of acromegaly in the third class being probably that a fatal termination occurs before the tissue change has taken place. Of the last variety there have been few cases reported.

The following analysis is furnished by Furnivall:— In a group of 34 cases there was hypertrophy of the hypophysis in 31 and degeneration in three; in 24 cases there was hypertrophy of the thyroid in 11, atrophy or degeneration in eight, and five were normal; in 17 cases there was hypertrophy of the thymus in four; in six cases it was persistent or re-developed, and in seven absent.

In view of the variation in the condition of the ductless glands, and of the fact that certain cases of acromegaly have been preceded by a myxœdematous condition, it would seem that we might look for some explanation of the complicated symptomatology in the pathological changes found in all these glands.

Naturally in this connection the question as to the function of the pituitary gland arises; Von Cyon (*Pflüger's Archives*, Vol. lxxxvii.) thinks it probable that the hypophysis contains two principles, one of which stimulates the centre for the vagus and the other the centre for the accelerans. By this means, as well as by increasing the venous flow, specially through the thyroid veins, it controls inter-cerebral pressure and acts as a protective mechanism to the brain. It has also a marked effect upon metabolism, causing greatly increased excretion of nitrogen and phosphates.

Stimulation of the hypophysis produces polyuria; the same effect also followed the administration of extract of the gland to a boy suffering from acromegaly. The diabetes so often associated with acromegaly appears to be due to degenerative changes in the pancreas and not directly to alteration in the hypophysis.

Schiff (*Wiener klin. Wochenschrift*, 1897, p. 277), from carefully conducted clinical work, demonstrates similar results. He kept several patients upon a diet of definite caloric value until the nitrogen excreted had been constant for several days; he then administered hypophysin tablets, and noted as a result great increase in the excretion of urine, urea, and phosphates; the last he found particularly in the fæces. He had previously given iodo-thyrin to the same patients with relatively little result, and in one case, a healthy man of 25, no results were apparent from either tablets or iodo-thyrin, except some increase of urine without a corresponding rise in the amount of nitrogen excreted.

Lloyd Andriesen (*Brit. Med. Journ.*, Vol. i., 1894), investigating the hypothesis from a morphological standpoint, finds that in certain larval and adult cyclostomata and ascidians there is a communication from the buccal cavity through the anterior ventral neuropore, infundibulum, and ventricular spaces, with the central canal of the spinal cord. By means of carmine emulsion he has been able to follow the circulation of water from the mouth to the neurenteric canal. He observes also a group of specialised cells at the base of the brain and around the opening of the infundibulum into the neural canal, and that the glandular portion of the hypophysis discharges its secretion into the infundibulum, where it mingles with the incoming stream of water. He considers that these cells act as a sensory organ serving to test the waters, and that the secretion assists the absorption of oxygen by the nerve tissue.

Among more highly developed animals the aquo-vascular system ceases to function and is replaced by a blood system. The hypophysis, however, does not atrophy, but increases in size relatively, and is very richly supplied with blood, proving that the gland still exerts active functions. The nerve cells show regressive change, the epithelium lining the infundibulum loses its cilia, becoming atrophic, and the gland is converted into a ductless one, influencing the organism by means of the circulating fluids in the body. In the cyclostomata, and some of the fishes, the gland is relatively large, becoming progressively smaller in the higher orders, showing that the gland is most active amongst aquatic creatures.

Andriesen draws a most interesting parallel between the hypophysis and the thyroid gland. The latter, he says, is developed in anatomical connection with the respiratory system and physiologically exerts a powerful influence upon gaseous metabolism. Both glands, he considers, are respiratory in function, and he shows that the changes produced by interference with their action are such as would be expected from deficient oxidation. It would be very interesting to determine whether the iodine contained in the secretion of these glands, can (as chlorine does in bleaching) convert oxygen into the nascent form and so influence metabolism.

It is a striking fact that the three observers quoted should arrive at a similar conclusion by such different methods, and should attribute to the hypophysis so great an influence upon oxidation.

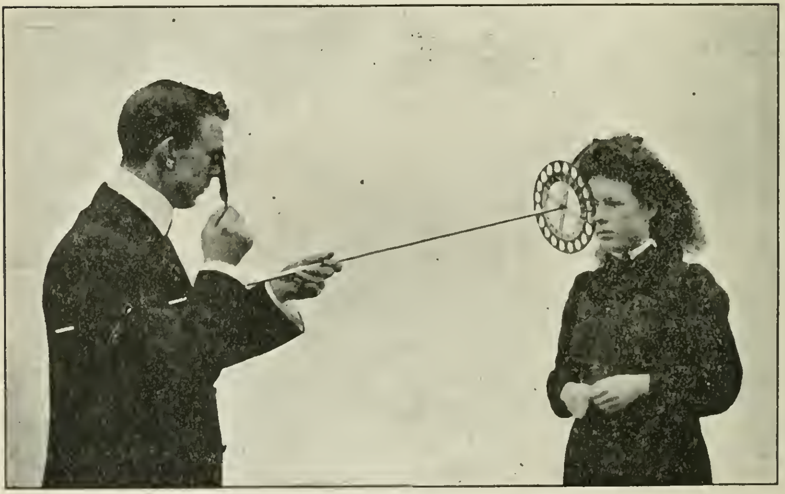
We have in the hypophysis a remedy of great and undoubted power, von Cyon (*Die Physiologische Hertzgifte, Pflüger's Archiv.*, Vol. lxxiii.) having been able by means of hypophysin even to neutralise the action of atropine upon the heart after that had become well established. The clinical determination of the value of preparations made from the hypophysis in acromegaly is, however, rendered difficult by the fact that so many cases have been placed upon combined treatment with thyroid and hypophysis, and also that in all more chronic cases marked remissions in the course of the disease may occur. The relief which is obtained from the intense headache by preparations of both thyroid and pituitary glands is sufficient to warrant their employment quite independently of other reasons. The amount of work which has been done recently in connection with the ductless glands is very considerable, and a perusal of some of the more recent original papers will be found both interesting and instructive.

The atypical field of vision found in this case was probably due to an asymmetrical enlargement of the pituitary gland pressing upon the left optic tract, and later upon the chasm, the subsequent involvement of the temporal half of the right retina being due to degeneration.

A CONVENIENT INSTRUMENT FOR RAPID RETINOSCOPY.

By H. Wright Thomson, M.D., Glasgow.

The illustration shows an instrument which I had made for use in an extensive examination of school children, but which has turned out to be of considerable use in expediting hospital refraction work. It consists of a light circular frame attached by its centre to a long stem, and having fitted into it twenty of the lenses most commonly used in retinoscopy. In use the instrument is chiefly supported by pressure of the right arm against the body. The left hand is only slightly thrust forward, and is concerned with directing and rotating the stem rather than bearing any weight. In practice I have found this position to be easily maintained, with momentary intervals between examinations, for an hour at a time.



The advantage which the instrument possesses over any device for a similar purpose which I have seen is that no special adjustment or position of the patient is required. Nothing is required of him but to be still and look in a certain direction. There is thus a minimum of time lost between examinations. The total weight is nine ounces, and the maker is Mr. Trotter, of 40, Gordon Street, Glasgow. The cost is small.

REVIEWS.

E. Zirm (Olmütz). **Our Present Knowledge of the Nutrition of the Lens and its Disturbances.** *Wiener Klinische Wochenschrift*, 12, 1905.

Brisseau in 1705 was the first to show that grey cataract is a disease of the lens. He was at first ridiculed, but later his idea was endorsed by his contemporaries. The lens in its embryonic state is surrounded by a network of blood-vessels; it has, however, neither vessels nor nerves after birth.

After describing the shape, position and structure of the lens, Zirm continues as follows:—As the fully-formed lens is without vessels, it has to get its increase in substance by osmosis from the surrounding eye fluids. It does not require any nutrition for its dioptric functions, but merely for growth. Its growth continues long after the rest of the body has ceased to grow; a slow formation of lens fibres in the region of the equator constitutes this growth. The weight of the lens increases steadily up to old age, according to Leber about 30 per cent. increase from the termination of growth of the rest of the body. The lens, being in a closed capsule, cannot be renewed by desquamation like other epithelial structures. The growth of the lens does not impair its transparency; and that nothing may harm this, its most important attribute, it is essential that the surrounding fluids should always be of the same composition and concentration, and that they contain no substance which might act injuriously on the lens, for the lens is very sensitive to the least change in the neighbouring structures, and it becomes hazy or its fibres are totally destroyed, just as if its own capsule or its epithelium had been injured. This, therefore, shows two things which may lead to a state of disturbed nutrition of the lens, *i.e.*, cataract. As the capsule of the lens is without anatomical pores it is nourished by means of endosmosis. From the aqueous humour and vitreous different substances, albumins and salts can enter the lens through the capsule and find exit in a similar manner. It is important to remember that admission of nutriment takes place from the vitreous to the posterior surface of the lens, but principally at its equator when the lens fibres are regenerated from the aqueous humour which exudes at this point from the neighbouring ciliary processes.

Deutschmann put fresh animal lenses in solutions of common salt of different concentration, and found they either absorbed or gave off fluid according to the state of saturation of the solutions. In both instances they became hazy. Human lenses act in like manner after death, for by osmotic changes the specific gravity of the aqueous humour is doubled within forty-eight hours. This is prevented during life by the capsule and its epithelium regulating the osmotic changes. This protection ceases when the epithelium or the capsule itself is damaged, *e.g.*, in traumatic cataract.

Leber says that in Förster's massage operation the epithelium is damaged, though the capsule of the lens is intact.

Kunde injected solutions of sodium chloride or sugar into the stomach or under the skin of frogs, and deprived them of water; as a result he found haziness of the lens, which disappeared when the frog got water.

Heubdel produced haziness of the lens by introducing powdered substances into the conjunctival sac or under the nictitating membrane.

In the foregoing experiments it is probable that through increased concentration of the eye fluids water is withdrawn from the lens and salts or sugar enter simultaneously. Deutschmann's experiments prove that this is not so in diabetic cataract, for experimentally cataract can only be produced when the eye media contain about 5 per cent. of sugar. In the case of a child 11 years old Deutschmann found the urine to contain 8 per cent. of sugar, and immediately after death the aqueous humour and vitreous to contain 0·5 per cent. and 0·366 per cent. of sugar respectively. The same experiments, by giving rabbits enormous quantities of sugar, could only bring the percentage in the aqueous humour up to 0·2 per cent.

and in the vitreous to 0·3 per cent. The brothers Cavazzani obtained similar results in dogs through producing glycosuria by extirpating the pancreas. Bouchard and Charrin produced haziness of the lens in rabbits by injecting naphthalin into the stomach. According to Hess the haze in these cases commences in the centre of the lens. Peters found the salts in the aqueous humour of a healthy animal to be 0·83, and in a naphthalin poisoned animal to be increased to 0·86—0·875. He believes it is this altered composition of the aqueous, and not the direct action of the poison on the lens, which is the cause of the cataract. Salffner, on the other hand, believes the cataract is produced by direct injury to the epithelium of the lens caused by a decomposition product of the naphthalin.

The result which is produced in massage cataract by an instrument is similarly produced in other cataracts by the irritation of poisons, chemical rays and electric discharges. Van der Hoeve and von Schiele report cases of haziness of lens after use of naphthol ointment, and of naphthalin emulsion exhibited in indigestion.

In glassblower's cataract Hess found the epithelium of lens capsule degenerated. Leber ascribes the cause of this cataract to the great evaporation from the surface of the cornea, together with the great loss of water by perspiration producing an altered constitution of the aqueous humour.

Czerny and Widmark, experimenting on animals, proved that cataract produced by focussing rays of light on the eye was caused by ultra-violet rays. The same applies to the effect of lightning.

As a result of senile change in the lens the peripheral layers show separation, the gaps becoming filled with a hazy fluid, thus forming what is called by Ammon the arcus senilis of the lens. This is not the commencement of cataract, but in 83 per cent. of cases the origin of cataract is in this zone. This mode of origin coincides with Peters' theory that disturbance of nutrition begins by the ciliary processes excreting chemically changed substances.

The author rejects as the cause of cataract the arterio-sclerotic theory of Michel and also the albuminuric theory of Deutschmann. Cases of cataract arising in tetanus, ergotism and convulsions are mentioned, the author having six cases in which there was loss of hair and nails. The modern theory is that nervous disturbances and trophic changes are caused by poisons which form in the intestinal canal, gravid uterus or other organs. The above six cases were of uterine origin.

The author believes that tetanic cataract is produced by a change in the ciliary processes causing disturbed nutrition according to Peters' hypothesis. Measurements of zonular cataract undertaken by Dub show that the diseased lens is smaller than the healthy lens at birth, proving that this cataract does not form in the first or second year, but is intra-uterine in origin.

Finally, the author mentions briefly some causes of cataract not previously indicated:—

1. Diseases of globe causing disturbed nutrition.

2. Vossius has assumed a connection between struma and cataract.

3. Bergmeister with gout.

4. Heredity.

5. Rothmund mentions three families, having cataract, who suffered from a peculiar skin degeneration. Nieden had a patient, a girl, age 22, with teleangiectasis of face.

6. Romiée mentions cataract after scarlet fever.

7. Malaria, typhus, leprosy and syphilis are also mentioned as causes.

H. HORSMAN MCNABB.

LEBER (Heidelberg). **The Pathogenesis of Cataract.** *Klinische Monatsblätter für Augenheilkunde*, March, 1905.

PETERS, in a recent article on the pathology of cataract, accused Leber of disregarding his work when dealing with the subject in (Leber's) "Circulation and Nutrition of the Eye." He complains that his theories and experiments are withheld from the reader, and in criticising the book points out that Leber has left unmentioned as a cause of cataract not only tetany, but also the cataract produced in animals by the administration of naphthalin.

In the present article Leber explains that his book is on the normal nutrition of the eye, and that pathological conditions could only be referred to if they served to explain these normal functions. He then goes on to attack Peters' work, and points out that Peters can claim no priority with regard to the relation of tetany and cataract, as Meinert in 1887, Bernhardt in 1891 and Wettendorfer in 1897 all wrote on this subject prior to Peters's paper in 1898.

Peters' earlier work was on the pathological anatomy of lamellar cataract, which he ascribed to a primary shrinking of the lens limited to the central portion. Leber criticises this, and believes that the shrinking is secondary. In later works Peters also attempts to bring this theory to bear upon cataract associated with tetany, and also senile cataract. Later, for lamellar and tetany cataract, he considered the convulsions with spasm of the ciliary muscle as being the cause, but after von Hippel had shown that long-continued application of eserine drops did not produce cataract, he discarded this theory and took the view that altered ciliary epithelium producing changes in nutrition in the lens must be the cause of cataract in these cases.

In 1894 Peters expressed doubts as to rickets being a cause of lamellar cataract, and subsequently stated that tetany was a more probable cause. He pointed out that very little was known as to the character of the convulsions in ricketty children in whom later lamellar cataracts were found, and that in a certain proportion of cases the convulsions were rather of the character of tetany if the descriptions given by the relatives could be believed. But even in those cases where the tetany was a part of the ricketty condition Peters ascribes the resulting cataract to the tetany, and not to the rickets. He states definitely that rickets as a cause of lamellar cataract is not proved. He believes that tetany is due to an auto-intoxication, and that the lens is damaged, directly or indirectly, by this toxic substance. In the latter case he supposes that the poison damages the ciliary epithelium, so that the aqueous becomes more cellular and contains more salts, and that these changes may be the cause of the loss of transparency in the lens. Leber in his criticism says it is difficult to understand how Peters can still throw doubts on the relation of rickets and lamellar cataract. No one doubts the etiological relation between nephritis and albuminuric retinitis, although the latter only occurs in the minority of cases.

With regard to changes in the ciliary epithelium, Peters found it first in a case of cataract with chronic nephritis which had gone on to tetany. He found a watery swelling or hyaline degeneration of the protoplasm of the ciliary epithelium, and considered that the tetany was the cause of this. As Schön had described cases of tetany in which were found changes in the ora serrata and ciliary region, Peters considered his case identical. Von Hippel, out of fourteen eyes hardened in formaline, found similar appearances in nine, and came to the conclusion that the changes occurred *post-mortem*. Peters himself also found these appearances in apparently normal eyes. Many of Schön's cases occurred in children born dead. Leber comes to the conclusion that the changes are either due to decomposition or to the hardening reagents.

Peters has also experimented with naphthalin on animals, and found, as many have before him, that the ciliary body becomes much congested; in fact, an irido-cyclitis is produced, resulting in definite changes in the epithelium. Whether the cataract occurs before these changes or as a result is open to question. Peters takes the latter view, and Leber the former. According to Peters similar results can be obtained by the use of ergot, and he maintains that the changes found in the ciliary epithelium indicate an alteration in the composition of the aqueous, which latter is really the cause of cataract. He argues that as the aqueous is less albuminous and contains a lower percentage of salts than the blood normally, it is the duty of the ciliary epithelium to prevent these solids from passing from the blood into the aqueous; when damaged, the epithelium is of course unable to fulfil its functions, the aqueous becomes more albuminous and the presence of this albumen is the cause of the lenticular changes. Leber denies that the salts dissolved in the aqueous are normally less than those in the blood, and states that many experiments have been undertaken by competent people to show that the aqueous normally has a higher percentage of salts than the blood and that its osmotic pressure is also greater. This would imply an active secretion on the part of the ciliary epithelium, and when diseased therefore the cells would lose this activity and lower the specific gravity of the aqueous to that of the blood, and not raise it, as Peters states. Leber then criticises Peters' methods because he did not use the ordinary analytical procedure, but estimated the amount of salt present by means of electrical conductivity. His results, which were not constant, show a percentage of sodium chloride in the normal aqueous of animals averaging 0·81 (varying from 0·75 to 0·85), and after naphthalin an average of 0·89 (varying from 0·84 to 0·92). The paper thus brings forward nothing new, and, indeed, is merely a criticism of Peters' work.

E. W. Brewerton.

Paul Roemer (Würzburg). **The Pathogenesis of Senile Cataract from the Point of View of Serum Investigations.** *Archiv für Ophthalmologie*, lx., 2.

This long, laborious and erudite paper, which covers a hundred and twenty pages, is in two parts; the first portion deals with the thesis that senile cataract is the result of the action of a cytotoxin, and the retention of such cytotoxin through the secretory apparatus of the eye. Senile cataract is generally regarded as the result of defective nutrition of the lens, either from general causes affecting the whole system or from local causes affecting the structures which secrete the aqueous humour. Römer considers that no explanation hitherto put forward is at all satisfactory. Clinical observation lends little support to the idea that failure of general health has anything to do with the majority of cases of senile cataract. Experiment proves that the osmotic pressure may be varied to a surprising degree without affecting the lens at all. Indeed, so independent is it of nourishment that it can be kept for months together in a suitable medium, such as oil, without losing its transparency. The new theory contained in these papers is that the lens becomes cataractous owing to the attack of a poisonous substance which kills its protoplasm in a way analogous to that by which a red blood corpuscle is destroyed by the process of hæmolysis. "If our knowledge," says Römer, "of the immunising processes in man teaches, as it does, that the human organism is capable of developing cytotoxic substances of the most various kinds, and of increasing the amount of others already present in the blood—then it is at any rate a possibility that, as a result of the degenerative processes of old age, anti-bodies are set free in the blood which possess a specific affinity for a certain definite part of the lens protoplasm, and which, provided that the secretory apparatus fails to keep them away from the lens, can, by uniting with corresponding receptors of the lens protoplasm, damage the cells of the lens, just as blood cells are damaged by the attachment to them of specific cytotoxins."

This extract indicates the line of research which these papers record. Starting from the Ehrlich theory of immunity, which is now generally accepted, the author undertook a series of experiments which go to show that just as the various bacteria and blood corpuscles have specific chemical properties which result in the production or neutralisation of specific toxins, so also the lens protoplasm possesses properties quite specific; further, as the phenomena of hæmolysis, etc., can be explained by Ehrlich's theory of the molecular composition of protoplasm and the presence in the serum of substances known as "amboceptors" and "complements," in the same way can the phenomena which the lens protoplasm exhibits be explained by the assumption of "receptors" belonging to its molecules, capable of uniting with substances necessary for the nutrition of the lens and also with toxic substances which may cause it to become opaque.

There are certain obvious difficulties about such a view. One is that for hæmolysis to take place in an animal it is ordinarily necessary to introduce serum from an individual of another species, *i.e.*, every individual is protected against the poison normally produced in its own blood. That this law is suspended in the case of certain diseases may be admitted, but if it requires an abnormal condition to suspend it then the attempt to make the normal processes of old age a sufficient cause breaks down.

Leaving this aside, we come to a second question, why, if the formation of substances toxic to the lens is a normal process of old age, do not all old people get cataract? Römer's answer is that it is a main function of the secretory apparatus of the ciliary body to keep back substances hurtful to the eye. Only when this function is insufficiently fulfilled can cataract develope. To illustrate his point he demonstrates that when a hæmolytic serum is introduced into any animal the hæmolytic substance is invariably absent from the intra-ocular fluids as tested by their power of dissolving blood corpuscles. Here, however, we come to a second unknown factor, the cause of the damage to the secretory apparatus.

Whatever view may be taken of the theory, the author brings forward certain facts which should be of interest to the physiological chemist. These are mostly contained in the second of the two papers here under review, entitled "The Nourishment of the Lens according to the Receptor Theory and the Proof of the Receptoral Constitution of the Lens Protoplasm." The following are examples of the class of experiments which this paper records:—One series shows that the lens substance of all mammals, including man, possesses the property of agglutinating rabbit's blood, but not the blood of any other animal. Another series of experiments shows that the lens substance contains protoplasmic groups capable of neutralising certain toxins, *e.g.*, the toxin of tetanus (in the case of rabbits). If the hardened nucleus of the lens is alone taken, the effect is much less marked. If instead of the toxin of tetanus certain other toxins are taken, there is no corresponding action on the part of the lens protoplasm. Again, the hæmolytic power of human serum towards rabbit's, pigeon's, or guinea-pig's blood is counteracted by the filtrate from triturated lens substance.

All this does not prove anything directly with regard to the causation of cataract, but it does show that the lens protoplasm possesses specific qualities different from other protoplasm. Those readers who desire to follow the author further into the intricacies of his theory must be referred to his original papers.

A. H. T.

J. Hirschberg (Berlin). **On Trachoma.** *Abdruck aus dem Klinischen Jahrbuch*, 1904.

In his lecture, Hirschberg first deals with trachoma from a historical and geographical standpoint. Watery eye produced by trachoma was noticed by medical men 3,400 years ago, but there is no proof that the disease was as prevalent as now, or as when Prosper Alpinus, the first European physician in Egypt, observed it in 1580. The ancient Greeks and Romans both described the disease; the Arabs of the Middle Ages accepted these descriptions, and had excellent methods of treatment. Later, many essays on trachoma are met with, all being reiterations of the ancients and the Arabs.

St. Yves (Paris, 1722), only just mentions the disease, but his contemporary, Maitre Jean, minutely describes it, the description apparently being a copy from Paulus of Aegina.

In discussing the question of the importation of the disease into Europe by Napoleon's troops, the lecturer does not think this is so for the whole of Europe, J. Beer having described trachoma in Vienna in 1792. There is, however, positive proof of importation into some districts on the Lower Rhine, *e.g.*, Saarlouis, and according to Vetch and Adams, into England. The lecturer next turns his attention to the pathological and clinical phase of the disease. For 2,000 years ophthalmia (inflammation of the eye, trachoma), has been known to be contagious, and although Pieringer in his work, "Die Blennorhœa am Menschenauge," Graz, 1841, has shown that infection was only conveyed by the pus from the conjunctiva, yet infection through the air has been upheld by A. v. Graefe as late as 1864, and by F. v. Arlt even in 1881. The latter says (*Klin. Darst. der Krank. d. Auges*, Vienna, 1881, p. 41): "Trachoma is infectious, not only by transference of matter, but also through the air."

Clinically, Hirschberg distinguishes the following forms of granular conjunctival inflammation:—

1. Chronic superficial granulation.
2. Chronic deep granulation (trachoma).
3. Acute primary granulation.
4. Acute secondary granulation.

He goes on to describe supposed causes of the disease, and the results of cicatricial contraction. He adduces facts to prove that sand, climate, flies, etc., are only contributory, and not direct causes of the disease, and has personally convinced himself that trachoma is the same the world over. In his practice he has found that towels, etc., used in washing are the chief agents in conveying infection, and that other granular inflammations of the conjunctiva and purulent conjunctivitis have no relation to trachoma. In acute catarrh supervening in trachoma the Koch-Weeks bacillus is found, though the infective germ of trachoma itself is not known.

In Europe trachoma is not found in districts more than 1,000 ft. above sea level, but in Algiers it is found at this and higher levels.

In reviewing the treatment of trachoma, he mentions the ordinary remedies, and gives a high place to copper sulphate and 1 per cent. solution of silver nitrate. He is opposed to the use of jequirity and to inoculation from purulent conjunctivitis. Though potassium iodide has been praised, he finds internal remedies of no use. For pannus he performs peritomy or burns round the cornea with galvano-cautery. In extirpation of granulations he prefers the use of Knapp's or other forceps to cutting away the granulations or the use of the galvano-cautery.

In his tabulation of districts and towns affected, Hirschberg puts as trachoma-free those with $1—2^0/_{00}$ trachoma patients of all eye patients, slightly affected $10—15^0/_{00}$, and markedly affected $100—200^0/_{00}$. Switzerland is most free from trachoma, England, France and Germany about equally affected. The town most markedly affected in Germany if Königsberg, with $159^0/_{00}$.

He advises improved hygienic measures and medical treatment to lower the number of cases.

Hirschberg believes that the unknown organism of trachoma may perhaps be found in stagnant waters. His reports of his visits to East and West Prussia, in 1896 and 1899, on the Trachoma Commission are published in *Klin. Jahrbüchern*, and the report on trachoma of Prof. Grósz, of Budapest, agrees almost *in toto* with these.

He recommends large, well-ventilated schools, better dwellings for the labouring classes, and prevention of importation of trachoma by labourers. In institutes and schools separate bowls and towels should be used. A certificate as to condition of eyes should be demanded of all children entering schools, and also of apprentices and domestics. In districts badly affected doctors should be appointed to treat trachoma patients free of charge, and specialists to supervise the treatment and attend the hospitals in the various districts.

These measures were adopted in Germany in 1896, and in 1899 improvement had taken place in 7 out of 10 districts in which it had been adopted.

H. Horsman McNabb.

W. G. Spiller and W. C. Posey (Philadelphia). **Recurrent Oculo-Motor Palsy, with a Report of a Case.** *American Journal of the Medical Sciences*, April, 1905.

Recurrent oculo-motor paralysis is a rare disease, of an example of which this paper gives an interesting account. The patient was a man of 31, a physician in Philadelphia, who seems to have had some difficulty with his eyes for five years or so. In his case all the extrinsic muscles supplied by the right third nerve were paralysed, but the iris and muscle of accommodation reacted normally. It appeared, on enquiry, that the patient, who had a good family history, and who was not neurotic, had suffered from true migraine at about 14 years of age; these attacks had gradually passed off, though he had more recently had a great deal of headache. He used at that time to have alarming seizures, in which he became for the time completely blind, save that he could always see light; an attack would last half an hour, and then, but not till then, severe headache came on, during which he suffered much from "flashes of light." His first attack of diplopia occurred after a period of hard professional work, and came on after two days of severe pain which was not of a migrainous character. At this time there was no ptosis, and the double vision was most marked when he looked to the left side and above. This condition lasted for several weeks before it gradually passed off, leaving no evil behind it. But in about six months diplopia returned, apparently of a type similar to that present on the former occasion, and this time there was ptosis in addition, this lasting four months, and, indeed, not entirely passing away even yet.

The authors then proceed to discuss the pathology of the condition, or, to be more accurate, to discuss the views expressed by Möbius as to the pathology, and refer to some of the limited number of cases already on record.

W. G. S.

WIDMARK. *Mitteilungen aus der Augenklinik des Carolinischen Medico-Chirurgischen Instituts zu Stockholm.* Part 6.

1. A. DALÉN (Lund). "So-called Sympathetic Choroiditis."
SYMPATHETIC choroiditis, described by Haab, etc., takes the form of a few small circular yellowish-red spots near the periphery of the fundus. They may reach a diameter of about $\frac{1}{6}$th of that of the papilla, and become paler in colour with a black spot in the centre. In three recent cases of sympathetic irido-cyclitis with neuro-retinitis Lund observed these spots when the inflammation had subsided. The cases had good recoveries, two with vision $= {}^5/_4$. Arguing from the known similarity of the pathological changes in the injured and the sympathetic eye, a search was made in the former for a basis for the clinical appearances. The three enucleated eyes had

each a dense infiltration of the uveal tract. A few small aggregations of epitheloid cells and lymphocytes were discovered at the equator lying between the unbroken lamina vitrea of the choroid and the pigment epithelium, which, along with the rods and cones, had disappeared over the larger ones. The leucocytes had apparently penetrated the lamina vitrea from the choroid, and the epithelial cells were either from the same source, or, as some contained pigment, descendants of the pigment epithelium. Such changes would give rise to the appearances described, and, granting this, the condition ought to be named sympathetic retino-choroiditis.

2. Widmark. "The Presence of Myopia in the Djursholm School."

Statistics for 1883 and 1884 showed a percentage of 46 and over the myopes in the higher classes of the Stockholm schools. This small school in one of the suburbs some miles out, contained only 22 per cent. among the two highest classes, and over 4 per cent. over the whole school of 151 pupils, with an average grade of 0·6 dioptres of myopia. The official statistics for all Sweden under constant medical inspection show a steady decline during the last eight years, but not enough to account for the low degree in this instance. The school building is an old castle with thick walls, and the light in consequence is not so satisfactory as would be expected from the situation, viz., standing alone on a slight height. The author is of opinion that this healthier condition must be due to the great freedom the children enjoy. Both summer and winter they have games and sports, or gardens to attend to, which keep them out of doors whenever possible. With snow-boots and skates they laugh at snow and ice, the presence of which in the city most frequently leads to discomfort. On the other hand, town children are kept more indoors by musical exercises, etc., or by the fear of the streets than their country cousins. This free life, acting also through the whole body, must tone up the eye for the work which it has to do.

3. K. Lindahl (Gefle). "Sodium Salicylate in the Treatment of Sympathetic Ophthalmia."

Thirteen cases of this affection are described. The first six were treated with bandages, warm fomentations, atropin and mercurial inunction. Four of these were left almost as bad as they could be. The remaining two recovered with moderate vision. The other seven cases had sodium salicylate, in daily doses of 60 and 90 grains, substituted for the mercury, but in three of these the inunctions were used after the salicylate had been tried for a time. One became immediately worse after this change, and the salicylate had to be resumed with ultimate vision 0·2 in the sympathising eye. A second case recovered with moderate vision (counting fingers at 33 feet); most of the improvement was during the administration of the salicylate. The third was a case of sympathetic choroiditis with floating vitreous opacities; there was no improvement until mercury was commenced. The remaining four cases were treated solely with the salicylate in addition to the local remedies mentioned. The first showed rapid improvement, and when, two and a half years later, increased tension occurred, Fuchs's transfixion of the iris was performed without any reaction. Ultimate vision was 0·8. A second case with pupillary membrane and total posterior synechiæ exhibited improvement up to $^{6}/_{60}$, but nine months later the sight was lost from separation of the retina. The last two cases had been treated with the salicylate for iridocyclitis of the injured eye before the sympathetic disease occurred. Both were mild cases, and were dismissed with vision equal to 1 and 0·9 respectively. The cases treated with the salicylate all showed a more or less favourable result in a less time than those subjected to mercurial inunction. Although the drug did not prevent the occurrence of sympathetic ophthalmia or relapses, it appeared to lessen the severity.

4. Widmark. "A Case of Tobacco Amblyopia leading to Complete Blindness."

A mason, 39 years of age, who had good sight up to two months before observation, was then temporarily blinded by a flash of lightning near him. From this he recovered, but vision almost immediately began to diminish, so that on admission he could only count fingers at two or three feet with either eye. There was a slight concentric contraction of the fields of vision with central scotoma for white and blue. He was completely blind for red and green. He chewed about a pound of black tobacco in the fortnight. There was no sign of other disease.

The patient improved somewhat with a return of red in the periphery of the fields under treatment with potassium iodide and abstinence from tobacco. Thereafter vision rapidly deteriorated, and within a few months went on to blindness with optic nerve atrophy. From the symptoms before the relapse the author was of opinion that it was a case of tobacco amblyopia. He then relates several other severe cases, and concludes that if this disease may at times leave a portion of the optic nerve atrophic it is not to be wondered if exceptionally it may affect the whole nerve, as in the present instance.

W. B. Inglis Pollock.

L. de Wecker (Paris). **Recent Attempts to Cure Cataract Without Operation.** *Annales d'Oculistique*, March, 1905.

The advance in these days in the region of therapeutics, and particularly of subcutaneous and subconjunctival therapeutics, has caused a revival of attempts aiming at the prevention and the cure of cataract. If cataract consists essentially in a separation of the elements of the lens from one another with formation or deposition of fluid in the space thus afforded, then there is nothing essentially absurd in the idea that possibly by means of treatment along certain lines one might succeed in restoring matters to the normal state, and at least in preventing the further process of cataract formations. When matters have advanced further and there is some distruction of lens fibres, with softening, or an atrophic state with sclerosis, affairs assume a different complexion. Even here, however, nature attempts a cure in an imperfect manner, for in the first of these instances the masses of cortex may become absorbed and the thin and shrunken nucleus fall down out of the way of the pupil, and in the second of the forms the progressive atrophy of the lens may be accompanied by an atrophy of the suspensory fibres, and the lens become spontaneously dislocated out of the line of sight.

In regard to the lines of treatment which one may adopt there are three possible indications, viz.: (1) to prevent the formation of cataract; (2) to check its further development once it has begun to form; (3) to restore the lost transparency of the lens. So far as one can tell, the first indication, the prevention of the formation of cataract, can be attained only by general good hygiene, attending carefully in particular to the free excretion of urea, and to the correction of any error of refraction. It has been claimed by Dransart that by these means cataract has been prevented in about half of the cases in which otherwise it would have occurred. This, as de Wecker points out, is an over-bold statement: no doubt something can be done by means calculated to relieve arterio-sclerosis, but how can one produce evidence of any actual reduction in the number of cataract patients? At what clinique has this occurred? In regard to the matter of arterio-sclerosis, de Wecker thinks it not improbable that some of these at least may have intermittent diabetes: he considers that frequent examination of the urine is, therefore, indicated in any given case so that any such evil indications may be promptly treated. Incidentally he points out, too, that one must not place too much reliance on reports from physicians at health resorts to the effect that vision was restored: these statements are frequently made after very insufficient examination, and an improvement in general health may bring with it some amelioration of vision without any particular change in the condition of the lens.

To turn now to the second point for consideration, namely, the arrest of the progress of commencing cataract formation, the primary difficulty in coming to any conclusion is the erratic way in which cataract may behave, advancing for a time, remaining stationary for weeks, months, or years, and then from no apparent reason lighting up again. Like others, de Wecker has learnt wisdom from observing how some of his colleagues were scoffed at by patients in whose cases they had promised early loss of sight to be followed by an operation; he consequently advises that the greatest caution should be maintained as to the probable rapidity of progress. Badal has recently claimed that by means of a solution of iodide of potassium used as a collyrium he has been able to check the advance of cataract, but the data on which he bases this claim are quite insufficient to bear the superstructure.

The third point for consideration, whether one can attain to the *restitutio ad integrum* of a lens partially cataractous, is inseparable from the last. It is a long time now since Arsonval suggested the employment of an extract made from ocular tissues, and more recently Lagrange has asserted that in cases of detachment of the retina injection of a fluid extract of the ciliary body has been of distinct benefit. Such claims can be better checked now than in former times, for nowadays one has means, in the ophthalmoscope and the test types, of really testing the progress or not of these opacities. By means of a high concave lens placed about 1 c.m. from the eye between it and a lighted candle, the patient can observe the striæ quite clearly. Verdereau, of Barcelona, has recorded a rise in vision from $^1/_{10}$ to $\frac{2}{3}$ as the result of numerous injections of iodide of potassium, but, unfortunately, this case stands by itself. Besides iodide of potassium 5 per cent., such an injection should contain also 1 per cent. of acoin (or 2 per cent. cocain), which has some effect at least in deadening the somewhat serious pain, if too much is not injected at a time. The injections should not be made subconjunctivally merely, but deeper into the orbital tissues, as in cases also of detachment of retina. De Wecker's own cases have not been sufficiently numerous as yet to justify him in making any very definite pronouncement as to the value of the treatment, but he is disposed to look upon it with some favour.

W. G. S.

DESBRIÈRES (Limoges) and BARGY (French Army). **Cataract Caused by an Electrical Injury.** *Annales d'Oculistique*, February, 1905.

THE patient, an electrician aged 26, presented himself complaining of loss of sight and giving the following history:—On May 16th, 1903, while engaged in cleaning an electrical transformer, he received a discharge of electrical energy equivalent to 20,000 volts. He "ought" to have been killed, but after half-an-hour of unconsciousness, thanks to rhythmical traction of the tongue and artificial respiration, he came to himself again. He was then found to be severely burnt by the discharge, and especially on the right side of the arm and face, and when the authors first saw him, about a fortnight after his accident, there was intense œdema all over the affected areas. The patient's eyes could not at that time be properly examined owing to the swelling, but he stated that this failure of sight began immediately after the injury, though he was unable to say whether it was to the eye condition or to the great œdema of the eyelids that this was due. Besides a very deep burn of the arm, the right ala of the nose had been partially destroyed as well as the cheek; there were cicatrices on the right upper lid also. On the left side of the body there was no injury, and the left eye was in regard to visual acuteness, transparency of media, and condition of fundus, perfectly normal. On the right side the conjunctiva showed evidence of burns, the iris acted well and the pupil was circular. In the lens were numerous points of opacity, some punctiform, some linear, over all the face of the lens but chiefly towards the equator: they were sub-capsular. The posterior layers of the lens showed nothing of this kind; so far as could be made out there was no lesion of the fundus. The patient complained that objects seen with that eye appeared as though in a mist, but his vision was $^{8}/_{10}$; during the first few days after the accident the patient had been unable to see anything whatever with that eye.

The visual acuteness was in this case superior to what might have been expected in view of the amount of opacity present, and this seems to have been quite a feature in certain other recorded examples of injury by electrical discharge. In a number of these, too, the opacity did not progress at all, certainly not for years, and had remained partial, as in this instance, in which things were exactly as before after the lapse of 18 months. The cases on record of cataract produced by lightning only amount to twelve (Gonin), and the authors have only been able to discover one case (Brixa) in which the accident was due to "artificial" electricity. In the instances of injury by lightning there is always the possibility of a malignant action by the ultraviolet rays, which does not apply, of course, in this case. Nor is there the complicating question of the heat-rays acting upon the crystalline through a cornea which itself remains transparent. Here we have to do with the action of the current pure and simple.

It is not impossible that the hyperæmia of the iris and ciliary body, which at first was intense, may have had considerable influence; the osmotic exchanges may have been greatly altered. In certain experiments Kiribuchi has been able to produce a sub-epithelial coagulation of albumin followed by degeneration both of the overlying epithelium and of the neighbouring fibres, and it is not impossible either that in some such way the lens may have undergone a partial alteration in the case in point. It is further possible that the chemistry of the aqueous humour may have become altered, and thus the transparency of the lens suffered. The suggested modes of origin of the cataract then are:—Chemical alterations, destructive action of the current, and alterations of circulation. The authors put forward a fourth explanation, namely a direct traumatic influence upon the lens itself, a shaking up, a rearrangement of elements, as the current passed.

As the optic nerve shows in their case no sign of injury, the authors are prepared to extract the lens with good prospect of success in the event of the opacity spreading through the remaining portions of the crystalline, but so far the condition has been stationary.

W. G. S.

M. Straub (Amsterdam). **Scrofula and Dormant Tuberculosis.**

The term "scrofula" has of late years fallen largely into disuse, being held by many to be equivalent to tuberculosis and therefore unnecessary and misleading. By some, however, the word is used to denote a special constitutional condition in which the tissues are abnormally susceptible to injurious influences, and which thus renders the individual more liable to be affected by tubercle bacilli and other pathogenic organisms. The name is, however, still used in connection with various affections predominating in children and familiar to everyone. Straub here discusses the ocular manifestations of scrofula. He admits that many of the so-called scrofulous inflammatory processes are purely tubercular in character, but not those that are seen in the eye and on the skin; and he regards "scrofula" as a proper clinical term, as denoting a distinct clinical type of tuberculosis, and would, therefore, retain it.

Ophthalmia eczematosa, he says, has a true tubercular basis, the nature of which will be referred to again, but also a distinct external exciting cause, viz., infection with pyogenic organisms (staphylococcus pyogenes) from without. Axenfeld and others deny that they constitute a cause, but would regard them as only accessory. Straub, however, strongly advocates this ectogenous origin of the phlyctenules on various grounds, viz., staphylococci were found in the course of his own researches and those of his pupils, Meyers and van Haaften, more frequently and in greater numbers in cases of this kind than in other eyes: they were found in the eczema of the skin accompanying the eye affection, and pathogenic bacteria are obtained even on normal skin and conjunctiva (thus providing a possible means of infection): the superficial position of the phlyctenules is against the idea of an endogeneous cause. On the other hand, it may be remarked that Leber failed to produce phlyctenules in man by staphylococcus, while the observations of Baas indicate rather an endogenous cause for them.

The tendency to recur and the resistance to treatment which these cases frequently exhibit point to the presence of some other factor which prepares the way for the pyogenic infection. This factor he takes to be a focus of "dormant" tuberculosis, which, judging from the evidence obtained from the *post-mortem* examinations of children, is most likely situated in the bronchial glands. The term "dormant" he prefers to "latent," as implying a small number and a diminished virulence of the tubercle bacilli. Such a focus may throw out toxines, which constitute the internal or predisposing cause of this eye disease.

This theory of a dormant tubercular focus as the internal cause, he adds, is applicable to all the forms of scrofula: this focus "poisons its host with toxines, makes him more susceptible to the external causes of the scrofulous exanthemata and threatens him with metastic surgical tuberculosis."

THOS. SNOWBALL.

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ORBITAL SARCOMA—KROENLEIN'S OPERATION.

By Lieutenant-Colonel C. P. Lukis, M.D., F.R.C.S., I.M.S.,
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Lachia Chamar, aged 45 years, was admitted into the Ophthalmic Hospital, Agra, on February 28th, 1905, giving the following history:—

About six months ago, one day, while he was chopping bundles of hay, a heavy chip struck his left eye. Since then the sight in that eye has gradually failed, and he has noticed steadily increasing protrusion of the globe, but at no time since the injury has there been any manifestation of inflammatory symptoms, or pain of acute nature. He has merely complained of a sense of heaviness and tension. It is possible, therefore, that the accident was merely a coincidence, and has no causal significance.

There is a swelling under the left upper lid pushing the eyeball bodily downwards, outwards, and forwards, causing considerable proptosis. The eyeball has thus come to rest almost on the malar prominence. On raising the eyelid a distinct tumour can be seen wedged in between the eyeball and the roof of the orbit; it appears to be larger than a walnut, rounded in shape, and elastic to the touch. It is slightly movable, and distended vessels can be seen crossing its surface. There is considerable lachrymation, the cornea is clear, the anterior chamber shallow, and the pupils moderately dilated and fixed; other media clear. On ophthalmoscopic examination, a uniform greyish haze appears all over the fundus, the disc can be made out with difficulty, its surface being blurred and hazy, and the outline indistinct. The patient is stone blind—has absolutely no perception of light in that eye. His general health is fair.

Assistant Surgeon C. M. Dé, in charge of the Ophthalmic Hospital, having brought to my notice Dr. Maynard's account of a successful operation performed by Krönlein's Method (*Ophthalmic Review*, June, 1904), I decided to perform a similar operation in this case. Accordingly on the 3rd of March, the patient being anæsthetised, and the left temple and eyebrow having been shaved and rendered aseptic in the usual manner, a curved incision with the convexity towards the outer canthus, was made down to the bone, extending from the temporal ridge to the zygoma. The flap being turned backwards, the periosteum on the outer wall of the orbit, together with the lachrymal gland, was then raised and pushed towards the eyeball, and kept away with a retractor during the rest of the operation. The periosteum over the external angular process of the frontal bone was next raised, and then gently separated with an elevator from the bone over the whole of the external wall of the orbit. The external angular process was then grooved about half an inch above the fronto-malar suture with Hey's saw, and finally cut through with a chisel. The chiselling was next continued obliquely backwards and downwards through the great wing of the sphenoid to the spheno-maxillary suture. Lastly, the frontal process of the malar bone was sawn through horizontally, and the piece of bone thus marked out was turned outwards. The chisel not being a very fine one, the small piece of bone above the fronto-malar suture here became separated and was removed.

The orbital periosteum was then slit up from before backwards, and the tumour being now exposed, was shelled out with the finger. This was accomplished without any difficulty, and it was not necessary to cut any of the ocular muscles. The bone was then replaced and the skin brought into position with horsehair sutures, a horsehair drain being left in the outer angle of the wound. The eyeball now completely receded into the orbit, and the lids were closed over it.

Two points need to be particularly noted about the operation:—

1. By not slitting the external canthus as was done by Dr. Maynard in his case, the conjunctival sac was preserved intact, and there was therefore no risk of bacterial infection of the wound.

2. No division of the ocular muscles was made, and therefore there was no danger of deviation of the ocular axis after repair.

Examination of the Tumour (Macroscopic). Length 2½ inches, width 1½ inches, weight 11 drams, encapsuled, lobulated, of firm consistency, white and homogeneous on section, no hæmorrhages or cysts.

Microscopic. A large spindle-celled sarcoma.

Subsequent history of the case. There was an uninterrupted progress towards recovery. The wound healed by first intention, and when the eye was opened on the seventh day the patient was found to have excellent vision, and perfect movement of the globe in all directions. There was however some ptosis, doubtless due to stretching of the levator palpebræ, and a moderate œdema of the upper lid. Both these symptoms are now slowly passing away. At the time of writing (March 31st), ophthalmoscopic examination of the fundus shows it to be quite normal in appearance, and his vision is $^6/_6$.

Remarks. According to Dr. Maynard this operation has only been performed 48 times—our case is therefore the 49th. The only recorded case in the United Kingdom appears to be one successfully performed by Dr. Louis Werner for a tumour of the optic nerve. (*Swanzy's Diseases of the Eye,* 8th edition). I therefore feel justified in bringing this operation strongly to the notice of the Ophthalmic surgeons, and I am sure they will find it preferable in every way to the old operation of enucleation of the globe, and removal of the tumour by incision of the fornix. The operation is easy to perform, and the only essentials are a sharp and thin chisel and a light touch.

I am greatly indebted to Assistant Surgeon C. M. Dé, not only for bringing the operation to my notice, but also for his assistance both at the time of the operation, and during the subsequent treatment.

REVIEWS.

W. Stock (Freiburg). **An Epithelial Tumour Arising from the Posterior Pigment Epithelium of the Iris.** *Klinische Monatsblätter für Augenheilkunde,* April, 1905.

A man, 46 years of age, was admitted to hospital in the late stages of consumption. There was found projecting into the right pupil a small round tumour from behind the iris, which was slightly bevelled forwards by it. The surface of the tumour was absolutely black, and of velvety appearance. It moved with the pupil, the latter reacting well to light. The anterior surface of the iris was perfectly clear from any growth. The other parts of the eyeball were normal, and vision was perfect. The patient died six weeks later, and the eyeball was removed *post-mortem.* There was found extensive tuberculosis of the lungs with cavity formation. The tumour was situated on the posterior surface of the iris. It measured in meridianal section 3 m.m. long, 1 m.m. thick, and projected

½ m.m. into the pupil. It was composed entirely of large epithelial cells with a number of small blood-vessels which entered it from the iris. There was no connective tissue apart from that accompanying the vessels. On depigmented sections there is seen a single layer of the normal posterior iris pigment passing on to the surface of the tumour. This layer is interrupted for a short distance over the summit. From the iris stroma the tumour is separated by a single layer of columnar epithelium arranged so that there were occasionally indentations at which the vessels entered the tumour. The pigment is irregularly scattered among the cells of the growth, but predominates at the margins. The tumour appears to have raised the pigmented epithelium upon its surface. The iris and the other parts of the eyeball are normal. There was no attachment to the lens capsule, and there was no evidence of old inflammation or cyclitis.

The classification of such a growth offers some difficulty. Is it to be included among the tumours? To answer this question we must consider the absence of all signs of inflammation. An iritis would have left some pigment attached to the lens capsule, or even some accumulation of leucocytes around or in the tumour. That the tension had never been raised is also against irido-cyclitis. The growth is homogeneous in itself, and in the absence of any sign of inflammation or of the specific new formations it must be included among the tumours. It is situated at the pupillary margin of the iris, but unfortunately the author does not give a drawing of the arrangements at that point except in a very low power sketch to show the relations. He simply states that in the same manner as already detailed the pigment epithelium passes on to the surface. The drawings give the impression of a tumour mass shoved under the epithelium, and gradually raising the same by its growth in the direction of the ciliary body.

The author concludes that the tumour arises from the pars retinalis iridis, and would call it a papillary epithelioma of the posterior membrane of the iris. He omits to mention its relation to the membrane of Bruch. The age of the growth is important, but on this point no information is available apart from that obtained by internal evidence. The blood-vessels have normal well-formed walls, and some of them show hyalin degeneration. Consequently it does not appear to have been of recent origin. On the contrary, there is nothing against its being congenital, and the reviewer regards it as a melanoma of the iris. It is similar to the one reported by Fuchs,[1] and also to that of Anargyros,[2] both of which apparently arose from the retinal epithelium of the iris. Whether these tumours may take on malignant growth has been doubted, and when they do it is suggested that they become sarcomata. This depends on the view we take of the cells composing the mass of the growth. In the present case they are large epithelial cells. There is, however, nothing said about the possibility that they may be endothelial. These melanomata are similar to the pigmented mole of the skin, and Parsons[3] shows that there is a growing tendency to regard the latter as of epidermal origin. In that case we ought to name the resulting malignant growths epitheliomata or carcinomata. Many writers deny that primary carcinoma has been discovered in the iris. It appears to the reviewer that carcinoma may attack the pars retinalis iridis, which is epithelial, just as it does any other epithelial structure. We have now a gradual series of cases illustrating the passage to malignancy. The present case and that of Fuchs are both innocent growths from the epithelium; throughout life they did not exhibit local malignancy or metastases. The case of Anargyros may be regarded as one with local metastases. The cases of William Robertson[4] and of Hirschberg and Birnbacher[5] show local malignancy. These last two cases have, however, been subjected to other interpretations. The former has been considered an endothelioma or alveolar sarcoma, and the latter an inflammatory manifestation. As to the former, it simply depends on what view we take of the nature of the cells whether they are endothelial, sarcomatous or epithelial. However, we must wait for further cases before we can hope for unanimity.

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1. Fuchs. "Melanoma Iridis." *Archiv für Augenheilkunde*, 1882, Vol. xi. *c.f.* Anargyros.
2. Anargyros. "Melanom der Iris." *Archiv für Augenheilkunde*, 1903, Vol. xliii., p. 62.
3. Parsons. "The Pathology of the Eye."
4. Robertson. *Ophthalmic Review*, 1895.
5. Hirschberg and Birnbacher. *Central. f. Prak, Augenheilkunde*, 1896, p. 289.

W. B. Inglis Pollock.

Victor Hanke (Vienna). **The Treatment of Diseases of the Eye.** Translated by J. Herbert Parsons and George Coats. London: Hodder and Stoughton, 1905.

This belongs to the large class of little books on the eye. It has much to recommend it, as so many of them have. It is based on the careful teaching and wide experience in Prof. Fuchs' clinique, its methods are those which are recognised by ophthalmic surgeons all the world over, its author holds no brief for any particular drug or mode of procedure, and it may be said very fairly to fulfil its aim of being a trustworthy guide to the general practitioner in such treatment of eye disease as he would be called on to undertake. But that there is any conspicuous niche for it to fill we find it difficult to believe. The author admits the existence of many excellent text-books on diseases of the eye, but thinks that with their multiplicity of subject matter they must have little space for the description of treatment. But is his little book in any better case? He has found, as was to be expected, that a rational description of treatment was impossible without some reference to diagnosis, and he has adopted the plan of giving a short description of each pathological condition which comes under consideration—a description which, short as it is, is often longer than the account of the treatment which follows it. Hence it comes about that of the 214 small pages in the book probably not more than 100 are devoted to treatment proper. We are bound to admit that he has compressed into those 100 pages an astonishing amount of information. There is no condition of the eye that we ever heard of—from ablepharon to ablation of the globe, from gerontoxon to glaucoma—that does not receive some notice. And this is the style of it; we open the book in the middle:—

"*Keratitis fascicularis.* A peculiar form of conjunctivitis phlyctenulosa, with superficial scrofulous or eczematous infiltration of the cornea. It appears as a radially directed grey furrow, in which superficial vessels run; the central end consists of a grey infiltrate sometimes a little prominent. It is caused by the spread of infiltration towards the centre of the cornea, with healing at the periphery.

"*Treatment.* Massage with iodoform, xeroform or atropin-sublimate ointment; later yellow precipitate ointment. When progressing towards the centre of the cornea cauterisation of the edge or scraping with a sharp spoon, and touching with alcohol, tincture of iodine or formalin solution, followed by irrigation with salt solution or water, or covering with a conjunctival flap."

Useful without a doubt, but somewhat painful to assimilate!

F. LAGRANGE (Bordeaux). **The Variations of Corneal Astigmatism with the Age of the Patient.** *Archives d'Ophtalmologie*, April, 1905.

IN order to settle for himself whether astigmatism, dependent on the cornea and present in youth, underwent variation as a patient grew older, Lagrange undertook the examination of a large number of young persons, suffering from astigmatism, at intervals of five years. As is quite well known, certain surgeons have affirmed that the refraction of the eye undergoes minute changes in a much shorter period of time, but such evidence as has been brought forward in proof of this is open to criticism. Lagrange, to be consistent throughout, made his examinations with the same instrument, and always with the greatest care, recording the resulting astigmatism. Unfortunately, as he himself says, he did not make a point of settling with equal care what was the *actual* radius of curvature of the cornea; in a case of alteration therefore he had no means of deciding at once which of the meridians it was which had undergone change. Nor, of course, does retinoscopy give any absolute guide either, even if it measures very precisely the amount of astigmatism present. With the premises, albeit admittedly not perfect, Lagrange constructs two general propositions—(1) that the astigmatism of hypermetropes has a decided tendency to diminish as the young patient advances in years, this tendency being more marked in persons who have not worn correcting glasses; and (2) that the astigmatism of myopes in the same condition has a tendency to increase. Lagrange then gives brief but sufficient details of seventy-five cases; of these, forty-four are examples of hypermetropic astigmatism, in forty-one of which a definite diminution in the total astigmatism was recorded, in some of them the amount of reduction being more than merely a little. In no case was there any increase in the amount, and in three only was it stationary. To judge from the results obtained by retinoscopy the change appears to result from an increase in the refractive power of the horizontal meridian, which has become more convex, but without precise measurement of the radius of curvature it might be rash to come to too absolute a conclusion. His statistics, too, bring out the curious fact noticed above, that this levelling up of the refractive power of the chief meridians occurred most markedly among those who had worn no correcting lenses. From this he deduces the conclusion that it is probably unwise to be over zealous in the employment of cylindrical lenses in young hypermetropes.

As regards the twenty-nine myopic astigmatic patients in the list, the astigmatism had increased in eighteen, diminished in two, and remained stationary in the others. Where increase took place the amount was usually from a half to one dioptre, but in one case had reached two dioptres, and in another one and a half.

When one enquires what the cause can be of those changes in refraction in hypermetropia and myopia, one is, says Lagrange in support of a theory propounded by Martin (Bordeaux) driven to the conclusion that it is due to the action of the ciliary muscle drawing partially upon the cornea. It is perfectly true that no immediate effect upon the corneal curve is visible from the action of the ciliary muscle, but such may well enough occur after a long period of time. Lagrange thinks that in a patient whose horizontal meridian has a flatter curve than his vertical—astigmatism with the rule,—efforts are made by the ciliary muscle to obtain an increased accommodation change in the horizontal meridian of the lens; the increased dragging upon the corneo-scleral area as the effect of this effort leads to the development of a curve of short radius in the horizontal meridian of the cornea. The myope, on the other hand, uses his accommodation but little; his eye is less well nourished at any rate, and therefore resists less than it should do the compressing influence of the lids upon the radius of curvature of the vertical meridian; hence the increase of the astigmatism (with the rule) in myopes.

Even if these theories are amenable to criticism, the observations are of much practical and theoretical importance.

W. G. S.

HABERKAMP (Bochum). **The Simplest Operation for Glaucoma.** *Die Ophthalmologische Klinik*, May 5th, 1905.

IT is, says Haberkamp, "all very well" to say that the proper treatment for glaucoma is iridectomy, but under certain conditions there are certain difficulties in the way of carrying out this method of treatment. From the surgeon's point of view, there is the difficulty of the performance of the operation, and a lurking doubt as to whether he may not do harm rather than good by surgical interference, and from the patient's side there is the natural shrinking from an operation whose issue is uncertain, and whose performance is attended with increased pain in an already painful eye. As a compromise, paracentesis of the anterior chamber is sometimes suggested, but like some other compromises, it pleases neither party to the transaction: it is unsatisfactory from a surgical point of view, and it makes the same demands upon the patient's courage as the more thorough operation. He considers, however, that in some cases at least the difficulty may be met by the performance of paracentesis by means of the cautery, which can be carried out in the consulting room, while its beneficial effect, similar, of course, to that obtained on the spot by paracentesis with the keratome, is, in addition, kept up for some time, opportunity being thus afforded for a re-arrangement of the relations between inflow and outflow. After a little experience, Haberkamp says it is quite possible to make the cautery incision in a manner such that the wound, one knows, will not heal for a certain number of days. Of course the place of operation is carefully selected in order to obviate the risk of any injury to vision. He has not been able to find in the literature any previous record of such an operation being recommended.

W. G. S.

BRAUNSCHWEIG (Halle). **The Diagnosis of Pulsating Exophthalmos.** *Klinische Monatsblätter für Augenheilkunde*, March, 1905.

THE author strongly advocates the use of the stethoscope in the diagnosis of this condition in doubtful cases. He mentions the case recorded by Borland in the *Lancet*, No. 4,237, which was that of a child born before term, in which there was right exophthalmos with paralysis of the superior rectus and subconjunctival hæmorrhage. After a considerable loss of blood from the nose the condition subsided. This case was supposed to have been an affection of the cavernous sinus. Braunschweig, however, believes it was simply hæmorrhage into the orbit. Experiments on the dead body show that in idiopathic aneurysm it is the intima which is first affected, usually by minute ulcers due to atheroma or to syphilis; these are unable to heal owing to the pressure, and may eventually produce the typical picture of pulsating exophthalmos. It is very rare for aneurysm of the ophthalmic artery to produce the condition. Braunschweig then reports the following case:—

A labourer, aged 22 years, gave a history of having shot himself in the right temple nine months previously. After recovering consciousness six hours later, he found that the vision of the right eye was much reduced. There was also a roaring noise in the head, which became less on lying down. He suffered much pain, and there was considerable prominence of the eye. At the time of examination there was much cyanosis of the head and face; the right eye was proptosed to the extent of 8 m.m., and on lightly pressing on the globe through the lid pulsation could be felt corresponding with the radial pulse. A bruit could be heard with the stethoscope over the right temple. On compressing the right common carotid the proptosis could be slightly reduced. The right pupil was half dilated, and did not react to light, either directly or consensually. There was paresis of the right external rectus, and some loss of sensation of the cornea and conjunctiva. There was besides weakness of the left arm with diminished sensation. By way of treatment the right common carotid artery was compressed three or four times a day from half an hour at first, the time being gradually increased to two hours. Vision improved, the noise in the head became less, and the proptosis subsided. The Röntgen rays showed the bullet to lie in the middle cranial fossa at the level of the upper end of the sphenoidal fissure. Further back, exactly corresponding with the cavernous sinus was another small body, probably a piece of brass cartridge casing.

Braunschweig claims that, so far as he is aware, this is the first time that a foreign body has been demonstrated in the living subject to have caused an aneurysm of the internal carotid in the cavernous sinus. The possibility of an aneurysm of the ophthalmic artery within the skull was put out of court on account of the absence of optic atrophy. Sphygmographic tracings were taken of the common carotid and the radial arteries and of the bulb; the last showed in the later tracings a much reduced impulse. The paresis of the left arm no doubt was due to direct injury of the cortical centres by the bullet. It is interesting to note that complete recovery of function resulted. With regard to the treatment of aneurysm of the internal carotid in the cavernous sinus, most authorities recommend at first compression of the common carotid, and should no improvement result the common carotid should be tied. After ligature of one common carotid it may be necessary to tie the other. A vital indication for ligature is copious hæmorrhage, which is apt to come from the nose, and another indication is loss of sight due to pressure on the optic nerve.

Lasarew has suggested that should ligature of the common carotid fail to cure the disease the superior orbital veins may be tied with advantage. Lastly, Lancereaux's suggestion of subcutaneous injections of gelatine to promote the coagulability of the blood may be considered.

Braunschweig does not mention ligature of the internal carotid as a form of treatment; this operation is followed far less frequently by cerebral trouble than ligature of the common carotid, and in our opinion is more likely to result in a cure of the disease.

E. W. Brewerton.

V. Berger and Loewy (Paris). **Ocular Affections Connected with the Female Genital Organs.** Paris: F. Alcan, 1905.

The aim of this book, which extends to rather more than two hundred pages, is to gather together and discuss the records of affections of the eyes which bear any definite relation to the reproductive organs in women, both to their normal activity at puberty, during gestation, etc., and to abnormal conditions also. Thus the greater incidence of certain varieties of interstitial keratitis about puberty, hæmorrhages into the anterior or the vitreous chamber at a menstrual epoch, scotomata in dysmenorrhœa, disseminated choroiditis attributable to amenorrhœa, scleritis at the menopause, detachment of the retina during pregnancy, and many other topics are dealt with. What gives the book a somewhat wider interest among the profession than it might otherwise have is the attention devoted to such matters of importance to the general practitioner as albuminuria in pregnancy, the occurrence of exophthalmic goitre, and the effects upon the eyes which have been observed in chlorosis and after ovariotomy,—all being points (and there are many more such also dealt with in this work) of much importance to the practising physician. There is a great amount of painstaking and valuable work in this little treatise.

LEWIN (Berlin) and GUILLERY (Cöln). **The Effects of Medicinal Drugs and of Poisons on the Eye.** Two Vols. Berlin: Aug. Hirschwald, 1905.

THE authors of this massive book, which runs to over 1,800 pages, have obviously bestowed an enormous amount of labour upon it. The reader is almost overwhelmed by the extraordinary scope of the work and the vast stores of information therein contained. It seems safe to state that no drug or other poison which has ever been suspected of exerting a prejudicial effect upon the eye has been omitted. As a book of reference it will prove of great value, and its value is enhanced by a very full index of authors and subjects. It is impossible to give even the briefest abstract of so extensive a work. The following few lines will give some idea of the contents, and of the arrangement of the subjects. The drugs and other substances are considered in groups, the grouping having reference chiefly to similarity of action on the tissues of the body or of that part particularly influenced by the drugs:

Group 1 includes all substances having a paralysing effect upon the nervous system, *e.g.*, general and local anæsthetics, narcotics, etc.

Group 2 deals with substances which have an exciting effect on the nervous system, *e.g.*, the various alcohols, tobacco, strychnia, etc.

Group 3 embraces those substances which react either chemically or physically upon living albumins, *e.g.*, metallic poisons, fungi, and many micro-organisms.

Group 4 deals with drugs which act as febrifuges or germicides.

Group 5 includes all the anthelmintics; and

Group 6 deals with drugs which influence the functions of the cardio-vascular system and the kidneys, such as digitalis, strophanthus, nitrite of amyl, etc.

Group 7 deals with a few substances whose effect on the eye is indirect or purely mechanical.

Encyclopédie Française d'Optalmologie. Edited by LAGRANGE et VALUDE. Vol. iv. Paris: Octave Doin, 1905.

THE fourth volume of this excellent treatise is well calculated to maintain the reputation acquired by its predecessors. The book reaches almost 900 pages, no less than 400 of which are devoted to a masterly article by Morax on the examination of the patient and on the symptoms and diagnosis of eye affections. This article in itself forms almost a treatise; nothing seems to have been omitted; it includes detailed descriptions, for example, of the pupillary reactions, ophthalmoscopic appearances, alterations of the field of vision, etc., concluding with remarks on the bacteriology, cytology and alterations of pressure of the cerebro-spinal fluid. The bacteriology and the diseases of the conjunctiva come in for a large share of the treatment, no less than 40 pages being occupied by this subject. It forms very interesting reading, more especially because it comes from the pen of one who is an authority on this matter. Of course many of the subjects dealt with by Morax will find repetition in other parts of the Encyclopedia, but we do not look upon this as a fault; on the contrary, we are inclined to think that different views regarding a subject, and more especially different methods of treating it (within reasonable limits, of course) rather add to the interest than detract from it. The remainder of the volume is divided equally between Berger and Rohmer, who contribute respectively articles on the relation of eye affections to general pathology, and on traumatic diseases of the eyeball. We can only say that they have accomplished their task in a most satisfactory manner. Actual criticism of a work so monumental, to have any value, would require a thorough digestion of its contents, which, however desirable, is practically almost impossible.

L. W.

POLACK. **Test Types in Complementary Colours.** *Revue Générale d'Ophtalmologie*, 5, 1905.

THESE test types, based upon the chromatic dispersion of the eye, are made up of parallel bars 6 millimetres in width, alternately red and green, the stripes running at different inclinations to agree with the different meridians of astigmatism. The important point about them is that when viewed at a distance of 5 metres the appearance of the stripes differs according to the state of refraction of the eye. The hypermetrope sees the green bars as white, and the red of a decidedly dull red; the myope sees the red as pale rose, and the green as a grey somewhat "deeper" than the rose tint of the others; while to the emmetrope the green stripes appears as of a full green and the red as a bright red.

To use the method as a quantitative test of the error of refraction one utilises his lens box in the usual manner, when the highest convex or the weakest concave lens, as the case may be, which gives to the letters their normal aspect is the measure of the error; Polack finds that this is a very accurate method. When the error of refraction is somewhat high the letters of course appear somewhat blurred in outline, and one must, as a preliminary measure, bring the ametropia down to moderate limits by an approximately correct glass, and having thus enabled the patient to have a clear view, proceed with the more precise estimate by observation of the colours as indicated above. He finds that there are several conditions under which the coloured test types may very usefully be employed:—

1. In cases of astigmatism the coloured test types have a great advantage in point of accuracy and delicacy over the ordinary black and white types.

2. In all doubtful cases where the acuteness of vision remains a little below the normal standard in spite of correction, the coloured types assist greatly in resolving the difficulty.

3. These types similarly gives one great assistance in finding the precise degree of myopia and in avoiding thus the risk of over-correction.

4. They are of much value in the examination of the amount of accommodation, particularly in astigmatic eyes.

5. In the case of an artist one can by their means facilitate the selection of such a lens as, without too precisely correcting

the refraction and giving actually the maximum accuracy possible, will enable the patient to obtain a rapid impression of the lighting and colour. Certain painters, he adds, have a trick of producing the desired effects upon their canvas by placing in contrast such colours as they desire rather than by mixing them. They thus no doubt produce to the normal eye the effect of lighting, etc., aimed at, but the custom is not to be commended, in that it is not to every eye that this desired effect is manifested,—it depends to some extent upon the condition of refraction.

W. G. S.

Paul Erdmann (Rostock). **A Contribution to Our Knowledge of Corneal Ulceration Due to the Diplo-Bacillus, with Experiments on the Resisting Power of the Diplo-Bacillus in Dried Secretions.** *Klinische Monatsblätter für Augenheilkunde*, May, 1905.

This paper is of interest in relation to the recent publication of Dr. Paul, Breslau, on the subject of diplo-bacillus ulcers. Paul recently described twenty-six cases of corneal ulceration due to this organism, and called attention to certain points of difference between this type of ulcer and the ordinary ulcus serpens.

Erdman has met with thirty cases in the Rostock clinic. In the majority of the cases the ulcer was marginal in position, though in Paul's cases the ulcer was usually central. Erdmann, like Paul, is convinced that the organisms found were really the cause of the ulceration. He found the bacilli specially abundant in the deep layers of the corneal infiltration in cases where hardly any organisms could be demonstrated in the conjunctiva. Eight of the cases are described as severe, having been accompanied by hypopyon and iritis. In these severe cases the ulcer was usually placed centrally. In four of the cases the ulcers healed under treatment with zinc preparations, while in the other four cases the cautery or the Saemisch section had to be used. In only one of the cases was there a history of antecedent injury, but Erdmann is of opinion that some sort of injury or abrasion usually precedes the formation of an ulcer.

The diplo-bacilli were found in many cases to grow well on glycerin agar, and in one case Erdmann was able to inoculate successfully from the seventh generation of such a culture.

A large number of experiments were done with the object of determining the probable mode of spread of the virus. Small sterile pieces of linen 5 m.m. square were introduced into the conjunctival sac until soaked with secretion containing diplo-bacilli. They were then put into sterile reagent glasses and kept at room temperature or in other cases at 36° C. in an incubator for periods varying from a few hours to several weeks. The bacilli in these pieces of linen were found to be inoculable on Loeffler's serum, even after so long a period as a fortnight. The organisms, however, did not live nearly so long in a thin layer of secretion spread on a cover glass and dried at room temperature. After seven hours they appeared to be incapable of growing on Loeffler's serum. It was also found that secretion on pieces of linen might retain its power of infecting the human conjunctival sac, though it failed to give positive results by culture; yet in other cases inoculation of the conjunctiva failed, though culture gave a positive result.

Erdmann further examined the nasal secretion in sixty-seven cases of diplo-bacillus conjunctivitis, finding it to contain the characteristic organism in forty-two instances. The diplo-bacillus may, however, be found in the nose, though no conjunctivitis is present.

In one hundred and forty-two cases in which no diplo-bacilli could be found in the conjunctival sac the organism was found in the nose sixty-four times. The nasal mucosa in these cases usually appeared quite normal. Inoculation of nasal secretion into the conjunctival sac may in such cases produce a typical conjunctivitis.

Erdmann occasionally found diplo-bacilli present in the conjunctival sac unaccompanied by any signs of conjunctivitis.

The question of whether the organisms usually reach the eye from the nose, or *vice versâ*, remains to be settled by further investigation.

J. V. Paterson.

Cirincione. **Retinitis Proliferans: An Anatomical Study.** *La Clinica Oculistica*, 1905, 1 and 2.

The writer describes, both clinically and microscopically, a typical case of this affection, which has so rarely been brought under the microscope.

The patient, æt. 48, noticed the vision of his right eye failing ten years before; this first commenced as a thin veil obscuring the vision, slowly deepening and increasing to form positive scotomata in the upper part of the field of vision; which scotomata in time coalesced, leading finally, three years ago, to complete extinction of vision. Externally there was nothing abnormal to be made out in the eye except that the pupil, which was moderately dilated, did not react in any way whatever. The left eye was normal. There was a history of malaria in youth, but none of specific infection.

Since the patient first came under observation, two years previously, the ophthalmoscopic appearance of the right eye remained unchanged. Placed horizontally across the disc, and covering it, was a large crescentic white mass from whose convexity bands radiated out towards the periphery. The nasal extremity of this crescent projected into the vitreous.

Microscopic examination showed that this condition was produced by connective tissue which covered the inner surface of the retina in more or less raised bands, which occasionally burst through the membrane limitans interna and made their way into the vitreous. This new-formed connective tissue was derived from, and directly connected with, the adventitia of the central artery of the retina, with whose main branches it spreads outwards in the inner layers of the retina, giving rise to the clinical picture of retinitis proliferans. The disc was cupped, and its space was filled by connective tissue fibres, while the retina adjoining was thickened to three times the normal owing to the interstitial deposition of connective tissue and to increase in Müller's supporting fibres, but more peripherally, where ophthalmoscopically the condition appeared to branch out, this connective tissue was sharply limited to the two inner layers of the retina, *i.e.*, the layers of nerve fibres and of nerve cells. The central artery of the retina and its main branches showed marked arterio-sclerosis, causing at several points complete occlusion of the lumen of the vessels. These degenerative changes were less marked the further one got from the disc. The sclerosed vessels gave off a number of arterioles which in section showed up in marked contrast to the main branches from which they were derived. The chorioid showed few changes of note, and those of an atrophic nature; the optic nerve was likewise atrophied. The equatorial part of the retina and the rest of the globe showed no changes.

A study of the few cases which have been examined shows that the connective tissue formation present in retinitis proliferans has not always been caused by the organisation of extravasated blood into the vitreous, but that other causes have been at work, such as, for instance, that in the author's case, where the pathological changes have been retinal. Cirincione, in fact, states that hæmorrhages and increased tension, both of which are occasionally met with in these cases, are not the cause of the condition of retinitis proliferans, but are, on the contrary, the result of it, the hæmorrhages following from the changes in the vessel walls, while the glaucoma results from the interference with the lymphatic return by the connective tissue overgrowth. This latter is the primary condition caused by the irritation of toxic agents acting through the vitreous on the central artery of the retina and its branches. One is here at a loss to follow Cirincione's speculations as to the primary cause of retinitis proliferans, for if a toxine or poison of some sort is at work why should it affect the retinal vessels *via* the vitreous, and why only in one eye?

THOMSON HENDERSON.

POSEY (Philadelphia). **Eye Symptoms connected with Disease of the Accessory Sinuses of the Nose.** *Journal of Eye, Ear and Throat Diseases*, March-April, 1905.

EVERY ophthalmic surgeon,—and no doubt every surgeon also in whose sphere of labour the nose is included, but it is with the former that we are concerned,—recognises the fact that between the affections of the nose and those of the eye there is a somewhat close relationship. Posey thinks, however, that such recognition, on his side of the Atlantic at all events, is apt to be limited to what one might call the more gross cases, and in his interesting paper (read before the Baltimore Ophthalmological Society) he confines himself rather to the cases in which it has occurred that a patient consulted an ophthalmic surgeon on account of eye symptoms that were really only a manifestation of nasal disease, which had up till then been unrecognised or neglected. It must be confessed that, perhaps because the accounts of the cases are necessarily somewhat condensed, in a number of the cases proof of such relationship is not very clearly shown to exist. He has divided his cases thus exhibiting early symptoms in the eye, or showing some peculiarity in clinical history, into six groups, and on each group he makes a few instructive remarks.

The first group is of cases which illustrate that diseases of the ethmoidal, sphenoidal, and antral cavities may be indicated by a moderate stasis in the circulation of the optic nerve, as indicated by slight ophthalmoscopic changes and by an interference with vision. The first case under this heading was that of a lad, who had apparently injured his nose and sinuses by undue swimming and diving, and in whom dizziness, diminished acuteness of vision, and slight inflammation of the optic nerve were the ophthalmic result. He recovered when his aquatic pursuits were regulated more wisely. Several other not very dissimilar cases are related under this heading also, including one or two in which para-central scotomata appeared to be attributable to nasal troubles.

Posey's second group includes cases in which the symptoms in the eye were those of an involvement of the 5th nerve. Thus one of his patients had severe neuralgia of the eye caused by rhinitis and sinusitis.

In his third group he places examples of œdema of the lids forming an indication of disease of the accessory sinuses of the nose. Examples of paralysis and paresis of exterior ocular muscles form his fourth group. In his fifth he records instances of a form of ophthalmoplegic migraine in which the symptoms are due to nasal trouble. Cases of false lachrymal abscess form his sixth and last group—that condition in which the abscess appears to be in the sac, and presents all the familiar indications of this disease, but in which incision does not set free the pus until the inner wall has been pierced and the cells forming it have been opened into.

The records of a number of the cases forming these groups are, as we said, not very convincing, and indeed some are simply examples of referred pain or of vagaries in œdema, but Posey's paper as a contribution to the encouragement of clinical accuracy is well worth attention.

W. G. S.

CLINICAL NOTES.

A New Method of Operation in Keratoconus.—Regarding the disease apparently as a morbid process affecting the central region of the cornea, Stoewer (Witten), after a rapid review of the recognised modes of treatment, remarks that any method ought to aim at two objectives, the removal of the diseased part and the most favourable healing of the defect thus produced. The first of these aims may be attained to some extent by certain of the operations at present in use, but he thinks the second is not achieved with so great probability.. In a certain case which he recently had under treatment, in which the deterioration of vision had been somewhat rapid, he dissected off a very considerable shaving or flap from the surface of the cornea: he would gladly have done this without escape of aqueous, but just at the summit of the cone, where the cornea is very thin in such cases, it did give way, and some of the fluid escaped. He then dissected up a bridge of conjunctiva, leaving it attached above and below the cornea, and slid it over the area from which he had removed the shaving of cornea, to cover it in, stitching it in position for a few days. It is probable that so far from having been a disadvantage, the accidental perforation at the central area was a real benefit. He obtained an immense improvement in vision (from finger-counting at 8 in. to $^4/_{20}$ without correction!) and a cornea almost free from serious opacity, and is naturally, therefore, much enamoured of that system of operation.—*Klinische Monatsblätter für Augenheilkunde*, April, 1905.

Correction of Astigmatism by Tilting the Lenses.—It is well known that many astigmatic myopes prefer, in place of wearing astigmatic, and therefore cumbrous and very expensive, lenses, to tilt their spherical lenses round a horizontal axis, and so correct the extra myopia present in the vertical meridian. The same is true to some extent of patients after extraction of cataract, many of whom are permanently astigmatic. Percival gives a formula by which one can calculate the degree of effect upon various lenses by different amounts of torsion. Percival, of course, does not recommend the adoption of this procedure as a routine, since the periscopic effect is greatly better when a sphero-cylinder is employed, but he has found it very useful on economical grounds in the case of a certain number of indigent patients.—*Ophthalmoscope*, June.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

The President, Mr. John Tweedy, in the Chair.
Meeting held June 8th, 1905.

Cases and Card Specimens.

Sections of an Eye containing pieces of Wood.—Mr. George Coats.

The eye had been injured by a piece of wood while the patient was "hedging," four days before its removal. There was a perforating wound of the cornea below in which the iris had become entangled, the lens had been injured, and the anterior chamber was filled with blood and lymph; septic infection becoming evident the eyeball had been enucleated. Microscopically, lying in the vitreous towards the anterior part of the ciliary body, a foreign body resembling a hair but not an eyelash was found; closely surrounding this was seen a mass of fine loose connective tissue, in which were many large giant cells, containing several nuclei. To the temporal side of the disc the retina, choroid, and sclera showed wounds in which were several pieces of wood, all of which were surrounded by giant cells. The case was shown as an illustration of the "so-called" foreign body giant-cells supposed to arise from the endothelium of the lymph or blood-vessels, phagocytic in their function and closely resembling the well-known giant cells found in tubercular lesions.

Case of Intra-ocular Swelling (Gumma), ? Neoplasm.—
Mr. G. W. Thompson.

The patient, a woman, suffered from defective vision of the left eye. With the ophthalmoscope a well-marked greyish area could be seen in the left fundus about one disc diameter to the outer side of the macula, this represented a detachment of the retina circular in form, circumscribed and raised about 2·5 D, the retina itself appeared normal and translucent, permitting a greyish-white, slightly pigmented tissue, presumably choroid, to be seen through it, though the vascular structure of the choroid could not be seen. A large patch of pigment was visible at one spot within the detached portion. A few lenticular opacities were seen, but no vitreous opacities. The family history of one miscarriage at 3 months, three premature births at 7 months, and one child still living with some eye trouble, pointed to a specific origin.

Case of Intra-ocular Swelling in an Adult (Tubercular).—
Mr. G. W. Thompson.

The patient, a married woman, had found the vision of her right eye beginning to fail in 1903; in 1904 central choroiditis limited to the macula had been found, and in April, 1905, an extensive elevation of the retina had been found in the region of the macula and optic disc and below them. This elevation was circular, confined to the region above described, and showed extensive choroido-retinal change, inflammatory in type, with blood-clots at or very near the macula itself. A good deal of retinal effusion appeared at the lower margin of the detachment, and inferiorly—almost at the periphery—was a mobile detachment separated from the central one by a deep sulcus. The highest part of the central elevation reached 9 D, but at the disc only 7 D, the disc itself appearing as if buried at the bottom of a funnel-shaped detachment. The patient's history was markedly tubercular, both of her sisters and her father died of phthisis, while of her own children only two were alive, and both of these showed tubercular manifestations.

Symmetrical Tumours of the Orbits in a Case of Acute Leukæmia, with rapidly fatal result.—Mr. L. Werner.

The patient, a lad aged 14 years, when seen in hospital just after admission, complained of pain in the left hip and down the leg, temp. 102°, pulse 102, respirations 30, lips covered with sordes, face very pale and puffy looking, body well nourished. The left eye was quite fixed, very prominent, and pushed forwards, downwards, and a little outwards, the conjunctiva considerably chemosed, and the cornea partly sloughed owing to the inability to close the eye. The lids were not in any way inflamed or hyperæmic. The right eye was also prominent, but to a much slighter degree than the left, and it was quite free in its movements, and the pupil reacted normally. Tumours could be distinctly felt through the upper lids projecting from the orbital cavities on each side like flattened rolls between the eyes and the upper margins of the orbits; these caused pain on being handled. The symmetrical character of the tumour combined with the anæmia led to the diagnosis of lymphoma, in support of which some enlarged glands on both sides of the neck were found, together with tenderness over the spleen, which latter, however, did not appear to be enlarged. Ophthalmoscopically, the right disc appeared intensely swollen, with the veins very large and tortuous, also at the margin of the disc a number of white patches and hæmorrhages were found, as well as numerous hæmorrhages scattered all over the fundus. Examination of the blood showed a very great preponderance of the white corpuscles over the red proportionally, the white consisting of large lymphocytes, eosinophile cells, etc. Acute lymphatic leucocythæmia was therefore diagnosed. The only history obtainable of the illness was that a fortnight before Christmas the patient had driven for an hour at night lying upon a cartload of wet grain, the day after this he felt unwell, was heavy and very drowsy, but still able to get about, and he had felt ill ever since. Three weeks before his admission to hospital, he had come home from school crying with pain in his left leg and hip; he had taken to bed and had never been able to get up again. Immediately before this it had been noticed that his eyes had become prominent with marked heaviness of the upper lids. He died on the sixth day after his admission to hospital, the temperature on the night before his death was 104°, but on the morning that he died the thermometer would not rise at all, though several different instruments were tried. No *post-mortem* examination was held since permission could not be obtained. Lagrange, who collected 25 cases of lymphoma of the orbit, pointed out the symmetrical nature of the affection, and considered this to be a fundamental clinical sign.

Microphthalmos associated with Congenital Orbital Tumour.—Mr. J. H. Parsons.

The patient, an infant girl 13 weeks old, presented a large cyst-like mass which pushed the lids forward from the right orbit, with displacement of the eyeball downwards and outwards; the mass was apparent in two distinct swellings, pushing forward the upper and lower lids respectively, the conjunctiva covering both was bluish but not markedly so. The orbit itself appeared considerably enlarged, measuring vertically $1\frac{1}{4}$ inches as opposed to $\frac{3}{4}$ of an inch on the left side. The right eyeball was considerably smaller than the left, and the fundus, examined ophthalmoscopically, showed a coloboma of the optic nerve, while just to the outer side of the disc the fundus appeared to come forward into the vitreous as though pushed forwards from behind, and still further to the outer side of the disc there was a more or less triangular patch, pale in colour, with the retinal vessels running over it, but no definite typical coloboma of the choroid was to be made out. This condition was stated to have been present at birth, at which time a large dark swelling had been noticed projecting from the right orbit, and at this time it appeared to have been especially prominent. Several opinions had been expressed as to the nature of the swelling, such as meningocele, meningo-encephalocele, hæmangioma, lymphangioma. congenital cyst of the orbit, plexiform neuroma, etc. Electrolysis had been tried, and some clear fluid had escaped, but no beneficial result was obtained. The escaping fluid did not reduce Fehling's solution.

Case of Probable Orbital Tumour.—Mr. George S. Keeling.

The patient, a man aged 47 years, had noticed his left eye becoming prominent with the onset of double vision, but without any pain or tenderness worth mentioning. The left eyeball appeared displaced forwards, downwards, and outwards, and all its movements were impaired except in an upward direction, and in this the movement of the globe appeared exaggerated. On palpation a distinct sense of resistance could be made out on pressing the eyeball back, but nothing in the nature of a swelling could be felt round the margin of the orbit. No pulsation of the globe could be seen, but with the stethoscope applied to the globe a faint venous hum could be heard. The fundus was quite normal with the exception of slight arterial pulsation. No specific history could be elicited, and no history of any serious illness was obtainable. The patient was put on Potassium Iodide, up to 60 grains in the day, and though no very appreciable result was noticed, still the patient himself considered that the eyeball was becoming less prominent.

A Case of Coralliform Cataract.—Mr. J. Herbert Fisher.

The patient was a woman aged 47, whose right eye had been operated upon for cataract by Mr. Couper twenty-five years ago, after which the vision had remained improved for a time, but later the patient recollected having heard it said that the "gap filled with cholesterine." This eye had been removed in 1901, since it was then quite blind, tender, and had a huge ciliary staphyloma over which the lids could not close. At this time the vision of the left eye was fairly good, there was an opacity in the anterior and posterior cortex of the lens which had latterly increased, and at the present time it showed an axial spindle uniting the front and back portions of the opacity. The individual particles comprising the changed portion in the cortex were very like coral in appearance, and many of them were brilliantly glistening. A similar case to this was shown before the Society by Mr. Marcus Gunn, in March, 1895, illustrated in Vol. xv. of the *Transactions;* his patient came of a family of which several members had developed cataract, some of them of this same coral-like type. The present case came from a decidedly cataractous family, the patient's mother had been operated upon by Mr. Hutchinson, one brother having had congenital cataract and been operated upon by Mr. Wordsworth.

A Case of Two Subhyaloid Hæmorrhages in one Eye with Hæmorrhage on the Disc.—Mr. Richard R. Cruise.

The patient, a widow aged 44, noticed on waking up one morning some months ago that the sight of her right eye had become blurred and gave her the impression of seeing through a "purple bladder." There was no history of accident, but she had an attack of bleeding from the nose last summer, and influenza last winter. An examination of the fundus revealed the presence of three hæmorrhages, one small one on the disc and two larger subhyaloid ones; of the two latter the larger occupied the typical spot just below the macula, was in shape like an inverted D, with a sharply defined upper margin; behind this passed the inferior temporal artery and vein. The second subhyaloid hæmorrhage was along the course of the superior nasal artery and vein, which were partly obliterated by it. There were also a few scattered smaller hæmorrhages in other parts of the fundus. The patient's urine contained neither sugar nor albumen, but its specific gravity was 1030.

A Case of Albuminuric Retinitis in a Young Girl.—Mr. Thomas Snowball.

The patient, a girl aged 17, a weaver, complained of defective vision especially by artificial light, and that her eyelids swelled very much at night; the failure of vision had been noticed twelve months, but latterly it had become much worse, with attacks of sickness, vomiting, and frontal headache. She had had scarlet fever when three years of age, followed by an abscess behind the ear, measles when eight years of age, and since scarlet fever had suffered from nocturnal enuresis. Her pulse was hard and her heart distinctly hypertrophied, but no murmur could be detected. The urine was considerable in quantity and contained albumen.

The right fundus. The disc showed considerable swelling, and had ill-defined margins, its surface was finely striated, while the arteries were small, but the veins were congested, tortuous and dark in colour. The macula was dull red in colour and surrounded by a typical rosette of brilliant white streaks and spots. From the upper and lower borders of this rosette numerous fine white spots radiated off and formed an almost complete ring round the disc; one or two yellowish patches, and many flame-shaped hæmorrhages completed the picture. The left fundus presented much the same aspects, but in many places the arteries appeared to obstruct the veins to a greater degree than in the other eye. The patient's condition grew steadily worse, the amount of urine passed in the day increased in quantity, the albumen increased, uræmic symptoms supervened, and the case terminated fatally. The case has been reported as bearing out Mr. Nettleship's observation that juvenile renal retinitis is more frequent in the female, and also on account of the well-marked ophthalmoscopic appearances. Two paintings accompanied the case.

PAPERS.

A Note upon Cribriform Choroido-Retinitis: a rare form of Fundus Disease.—By Messrs. R. W. Doyne and Sydney Stephenson.

This paper consisted in the description and discussion of three cases of retino-choroidal affection which, as stated, had not been hitherto definitely described.

Case i. A woman aged 32 years had sustained an injury to her left eye from a stick thrust into it. Ophthalmoscopically the right fundus showed typical disseminated choroiditis. The left showed more marked changes than the right, and in addition, an area of glistening, whitish effusion situated above, below, and to the outer side of the macula region. This white area of exudation—for such it was supposed to be—roughly L shaped, was pierced at several spots by round or oval holes—hence the term cribriform,—through some of which the red reflex could be obtained, while others were filled with pigment. This mass of exudation was raised in places above the level of the surrounding fundus. Above and to the inner side of the disc another patch of whitish exudation was visible.

Case ii. A man, aged 35 years, with a history of chancre 12 years before he had been treated for his eye trouble. Examination of the fundus of the left eye showed in the central region several large masses of white exudation lying beneath the retinal vessels and entirely free from pigmentation. These white sheets were perforated by numerous holes, some round, some oval, and some irregular in shape, through all of which the red colour of the choroid, together with its markings, could be made out. The peripheral parts of the fundus showed characteristic disseminated choroido-retinitis. The right fundus in the central region showed a similar fenestrated change, though to a much less extent than in the left eye.

Case iii. A woman aged 40. The right fundus showed on the inner side of the disc a curvilinear greyish-white line, very like an old rupture of the choroid, in the centre of which was an oval white spot. On the outer side of the disc in the yellow spot region were to be seen three masses of whitish exudation crossed by retinal vessels, and in one spot—that lying between the disc and yellow spot—cribriform in character and showing also towards the upper part a large hole, roughly oval in shape, through which the underlying red choroid could be made out. The rest of these patches appeared to be patches of choroidal atrophy bordered by pigment and crossed by the retinal vessels, while at the fovea itself some white shining crystals, presumably of cholesterine, were visible. This particular form of choroido-retinitis appeared to be essentially marked out by a membranous sheet of white exudation covering a large area of the fundus, lying beneath the retinal vessels, and showing a varying number of perforations. These latter were either filled with pigment, or allowed the red of the choroid to shine through. The writers considered that acquired syphilis was probably the cause of the disease and that in no case was there any suspicion of the presence of the hereditary complaint.

Case of Cerebellar Cyst, Operated on in April, 1903 (to illustrate the complete disappearance of signs of optic neuritis).—Mr. Leslie Paton.

The patient, a man aged 17, showed the first symptoms of cerebellar tumour in November, 1902, with progressive dimness of vision in December of the same year. Well-marked optic neuritis with considerable swelling of the disc—+4.D in the right eye, +3.D in the left. A bad prognosis as to vision was given, and an operation was performed when great increase in the intra-dural tension was found, together with a cerebellar cyst in the left lateral lobe. At the present time the discs appeared normal and the vision with the left eye had improved to $^6/_6$ partly, the vision of the right eye had also much improved, viz., from $^6/_{36}$ to $^6/_{12}$. The writer believed that in all cases where an operation was decided upon it was well-nigh useless merely to trephine the skull, but that the dura should always be opened.

Ring Sarcoma of the Uveal Tract, originating close to the Angle of the Anterior Chamber; intense Melanosis of the Iris and of the Angle of the Anterior Chamber in its Whole Circumference; Secondary Glaucoma.—Mr. L. Werner.

The patient, a lad aged 18 years, was admitted to hospital on account of loss of sight of his right eye, which had slowly been coming on during the previous nine months; latterly he had noticed dark spots forming on the iris. Owing to the darkness of the pigmentation of the iris, the case at first sight looked like one of aniridia. The tension of the eye was +1, and a deep glaucomatous cup was found with the ophthalmoscope. The iris was almost completely covered with coal-black patches of pigment, while to the outer side, just below the horizontal meridian, a dark-brown mass was present, wedged into the angle of the anterior chamber. The clinical diagnosis was "sarcoma of the iris with secondary glaucoma," and the eyeball was accordingly removed. At the present time, that is one year and five months after the operation, the boy appears to be in perfect health. Microscopically examined, the large mass which was wedged between the cornea and the iris in the outer quadrant consisted of spindle cells collected into interlacing bundles, closely packed, and without any intercellular tissue, and only moderately pigmented, except in the central area. The iris itself showed pigmented cells dipping down in places into the stroma of the iris, into the crypts, and spreading to the angle of the anterior chamber. The angle was especially interesting:—occupied in one place by the brown mass previously described, in the rest of its extent it appeared deeper than normal, more rounded off, and lined by a single layer of deeply pigmented cells placed at right angles to the surface. This pigmented lining extended from the commencement of the ligamentum pectinatum in front, round the angle of the anterior chamber, and on the surface of the iris for a distance of about 1 mm.; in some places the cells proliferated to form tuft-like tumours in the angle. Just inside the corneal margin the cell proliferation was still more active, forming a very thick layer internal to which a large number of round, deeply pigmented, cells, were seen lying free in the anterior chamber. The ciliary body in its whole extent was affected, but the changes were limited to a small area close to the angle of the anterior chamber between the origin of the ciliary muscle and the ligamentum pectinatum in front, and the root of the iris and commencement of the ciliary processes behind. No extension to the choroid could be made out. The canal of Schlemm and meshes of the ligamentum pectinatum were filled with pigmented cells. The cornea was not affected, and neither was the membrane of Descemet; the lens also was normal; the optic disc showed deep cupping, and the nerve itself was in a condition of advanced atrophy. The writer considered the case to be a typical example of diffuse ring sarcoma of the uveal tract.

Further Note on a Case of Orbital Tumour previously shown.— Mr. F. Richardson Cross.

This patient had been shown at one of the previous meetings for the purposes of diagnosis, with proptosis, some displacement of the eyeball, and an occasional tendency to dislocation of the eyeball forwards. Krönlein's operation had since been performed, with the result that a hard swelling, which had previously been felt, proved to be a tumour of the lachrymal gland, partly encapsuled, but passing in an irregular manner backwards behind the globe as far as the apex of the orbit. The optic nerve, eyeball, and the parts lying at the lower and inner part of the orbit were left intact. After removal, the tumour was seen to be the size of a small tangerine orange, cutting like a scirrhus of the breast, and without any definite capsule. Microscopically the growth presented the appearance of a fibro-adenoma or a multi-locular cystic growth, but no portion of normal lachrymal gland structure could be found in it.

The Use of Strong Applications in the Treatment of Ophthalmia.— Dr. W. E. Cant.

This paper dealt with the subject of the various methods of treatment adopted in Palestine for the relief of ophthalmia, which is endemic there, and which during six months of every year—from July to December—becomes acute and epidemic. and more especially with reference to the harm caused by very strong solutions of nitrate of silver (of a strength of 60 gr. to the ounce, and also of 20 per cent. strength) used. Many cases of damage caused by these excessively strong solutions were brought to the hospital, not for the relief of the ophthalmia but for the relief of the scarring, etc., caused by the silver salt. These latter had come to be readily recognised, the immediate effect of the strong applications being an exaggeration of the appearances presented by severe ophthalmia of the purulent type, such as a blown-up appearance of the lids owing to œdema, together with a purplish discolouration, some fluid discharge of a greyish colour, neither yellow nor sticky, like the ordinary discharge due to the disease. On everting the lids a pale coloured patch, varying from pinkish to almost white, was sometimes seen, and this eschar took some days to clear up, which it appeared to do by molecular disintegration rather than by separation *en masse*. Great thickening of the conjunctiva remained, with nodulation and rough swollen folds, and in some cases permanent cicatrization on the inner surface of the lids had been left. The *cul-de-sacs* usually participated in the general œdema and subsequent thickening. These cases, so treated with very strong applications, supplied the greater number of and the most severe corneal complications, such as suppurative keratitis and sloughing ulcers. Cases so treated were found to react so severely to milder applications of the drug as to preclude its use even in very mild solutions. The writer considers 3 per cent. to be the strongest solution admissible for routine practice, and even that should be used only once daily. Where corneal complications are present weak solutions for instillation as drops should not be used. Protargol and argyrol had not so far been tried by the writer.

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HEREDITARY CONGENITAL NIGHT-BLINDNESS WITHOUT VISIBLE OPHTHALMOSCOPIC CHANGES.

By W. W. Sinclair, M.B., Ipswich.

In a most instructive paper (*Royal London Ophthalmic Hospital Reports*, Vol. xi., Part iv.) "On some of the forms of congenital and infantile amblyopia," Nettleship describes a group of cases characterised by congenital, stationary, night-blindness with inconspicuous fundus changes, consisting mainly of irregularity of the pigmented epithelium and the presence of scattered minute white dots, and gives a remarkable pedigree of a family so affected. One of the cases examined by Nettleship is stated to have shown "no ophthalmoscopic changes." All the affected persons were males, and the great majority inherited through the mother. It is to be noted that the four patients examined by Nettleship were all myopic. Nettleship, in the same paper, gives notes of three other single cases of night-blindness, all in males. Two were myopic. In one of these there were "no definite ophthalmoscopic changes except large myopic crescents," in the other there were fairly well-marked changes in the retinal epithelium. In the third case there was considerable amblyopia, not improved by glasses, with "ophthalmoscopic appearances perfectly normal in every particular."

Nettleship refers to Leber's short account of congenital night-blindness without retinitis pigmentosa, and with only slight changes (*Graefe und Saemisch.*, Vol. v., p. 648).

In Vol. xiii. of the *Transactions of the Ophthalmological Society*, Morton gives the pedigree of a family case of hereditary night-blindness without visible fundus change. All the affected persons were males, and the condition appears to have been associated with fair hair. Both the patients examined by Morton were myopic, and both had markedly contracted fields. Another seen by Tatham Thompson of Cardiff had progressive myopia with "irregularly scattered pigment at the periphery," but the aspect was "not at all typical of pigmentary retinitis." Three other brothers had night-blindness but "no pigmentary retinitis" (refraction is not stated).

The affected members of the family, the pedigree of which accompanies this note, appear to belong to a group related to those above mentioned, but differing from them in one or two important respects. The interesting points are :—

1. Females were affected as well as males.

2. In neither of the cases seen was the condition associated with myopia.

3. In the two cases examined the ophthalmoscopic appearances were perfectly normal in every respect.

4. Where a father or mother was unaffected their children invariably escaped.

Case i. A boy aged 11 years. V.$={}^{5}/_{6}$ in each eye; no Hm. Field of full size in ordinary day light. Colour vision normal (Holmgren).

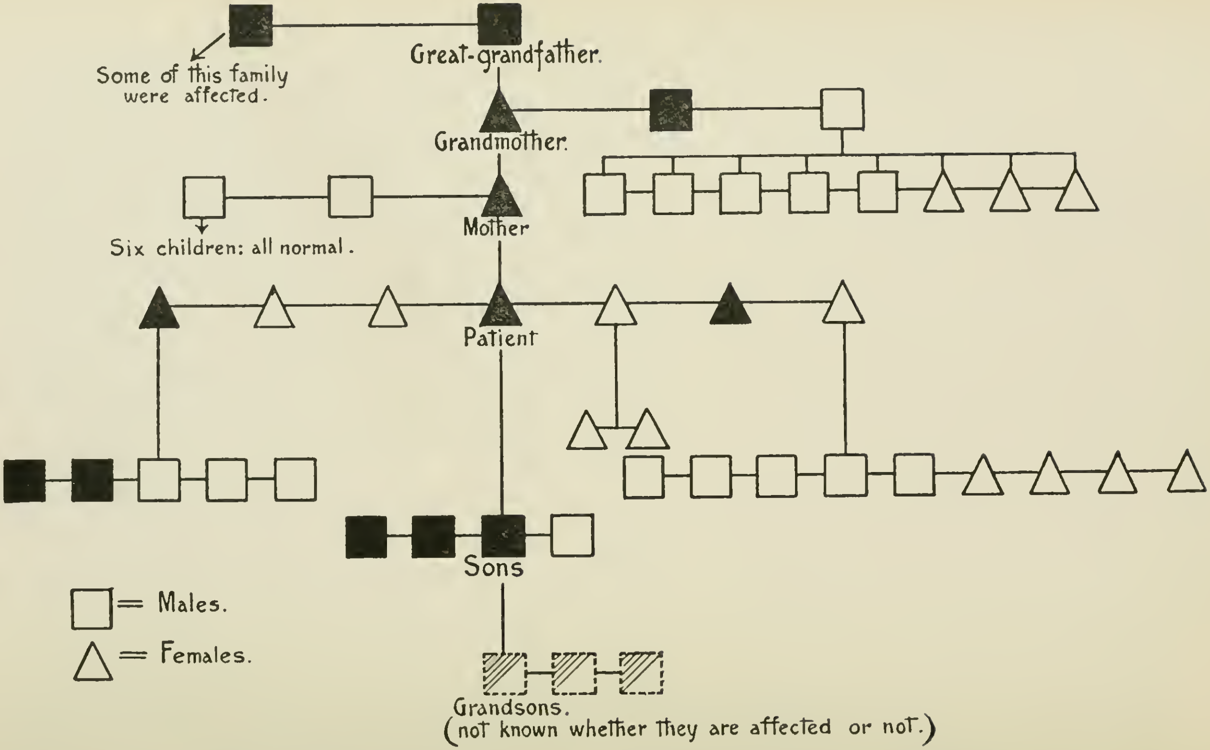
Case ii. Mother of Case i., aged 50. V.$={}^{5}/_{6}$ in each eye; no Hm. Field full in day light. Colour vision normal (Holmgren).

In spite of the normal sight and Field in ordinary light, and the absence of any visible pathological changes in the eye, both patients, like the others in the family who were affected, were night-blind to such a degree that when they had to go out anywhere after dusk one of the unaffected members had to accompany them in the capacity of guide.

In testing the visual Field under diminished illumination it was noticeable that a moderate reduction of light caused no alteration in the size of the Field; but when the illumination fell below a certain point the Field was very markedly reduced as compared with my own under the same conditions. Examination with the photometer revealed, as one expected, a great defect in the Light Sense. I tested the light minimum in Case 2, in a sister who was not affected with night-blindness, and in myself, after thorough (20 minutes) adaptation. The light minimum in the sister and in my own case was 2, while that of the night-blind patient was 7, a very striking difference.

The night-blindness appears to be congenital, and non-progressive. There was no consanguinity so far as could be ascertained, and no associated deafness or other defect, either physical or mental. Indeed those members of the family whom I saw were without exception "pictures of health," and exceptionally intelligent members of the lower middle class. The existence of night-blindness as a family complaint was of course well known to them, and they took much interest in helping me to collect the facts from which the pedigree is constructed. This shows that at least five generations have been affected. The married son of Case ii. had mysteriously left his supposed address and has not so far been traced. It is therefore unknown whether any of his children, forming the sixth generation on the pedigree, are night-blind or not.

The meaning of such a condition as exists in this family must at present be quite uncertain, but it seems best explained as an inherited diminution in the photo-chemical activity of the retina.


Some of this family were affected.
Great-grandfather.
Grandmother.
Mother
Six children: all normal.
Patient
Sons
□ = Males.
△ = Females.
Grandsons.
(not known whether they are affected or not.)

Those represented by black figures are known or reported to be "night-blind."

REVIEWS.

Grunert (Bremen), Gullstrand (Upsala), Hotz (Chicago). **The Formation of a Socket to Carry a Glass Eye.** *Klinische Monatsblätter für Augenheilkunde*, March, 1905.

In a recent number of the *Klinische Monatsblätter für Augenheilkunde* appear the very interesting papers relating the experience of their authors in attempting the difficult task of enlarging a contracted socket so that it may hold a glass eye. Two of these articles also contain a description of the closely allied operation for curing symblepharon.

Grunert says that the great difficulty hitherto has been the cicatricial contraction that sooner or later sets in, whether a pedicled or a transplanted flap has been used. May's operation was a distinct advance on former attempts. It consists essentially in freeing the lids by dissection till a sufficient cavity has been formed. A Tiersch flap is now wrapped round a glass eye, raw surface outwards, and inserted into the cavity. The edges of the lids are then temporarily sewn together. Though a good union usually results, many operators have found that the flap tends to slide downwards. Grunert gives a detailed account of four cases. In one of these nine operations were required, in another seven, in a third three, while the last patient got off with only two. In the first two cases the treatment lasted a year and a half, in the other two it was completed in two months. They were all able to wear glass eyes which from the photographs seemed to look very well. In summing up he does not recommend a pedicled flap, except in cases where a great deal of conjunctiva still remains. In two of his cases a flap from the temple was introduced through a space formed by slitting the outer canthus. The outer ends of the lids were kept too widely separate by the pedicle, and would not hold a glass eye. This defect had to be remedied by a subsequent operation. If a pedicled flap is employed at all, the incision in the socket should be made horizontally and the two halves of the conjunctiva left in connection with the lids. It is then essential to remove as freely as possible all cicatricial tissue as well as any remains of an eye-ball. All cicatricial contraction should be over before operating, and if the first attempt is not successful, a second should not be made too soon. In one case a second unsuccessful operation was performed after an interval of nine months. But the failure may have been largely due to making the horizontal incision lie in the shrunken remains of the former flap; for he subsequently attained success by making two curved incisions in the conjunctiva nearer the edges of the lids, leaving a central cicatricial island and then filling in the spaces above and below with two flaps from the arm.

The difficulties of this and all other operations up till now have been as follows:—

1. It is not easy to clothe the socket with an accurately-fitting flap.

2. These cases present a very undesirable floor on which to graft a flap. It either consists of poorly vascular cicatrix, normal orbital fat, or some remnants of sclerotic.

3. There is no means of keeping the flap immovable and well pressed down upon the surface with which it is to unite, because the orbital tissue is soft and yielding.

His own operation, which embodies what is good in former attempts, is performed thus:—Two incisions in the conjunctiva are made parallel to each lid and as near their edges as possible, care being taken to leave a large central island of conjunctiva. Both lids are freed so that they can be fully everted. To make complete eversion more easy a horizontal incision is carried through the outer canthus, or if still greater eversion is required, two diverging incisions beginning at the outer canthus may be employed, one going up and out, the other down and out. The lids are then well everted, the upper one stitched to the shaved eyebrow and the lower to the cheek. Several sutures, each armed with two needles, are employed. The needles are entered close to the edge of the lid on its inner surface, and after passing deeply through the skin are tied over glass beads. The lids are not only to be everted as far as possible, but should also be stretched horizontally. When all bleeding has ceased, two very thin flaps are laid on, large enough to cover the raw surface of the lids as well as the space produced by dividing the outer canthus. The three difficulties above mentioned are thus met.

1. One is not working in a hole.

2. The flap is laid on a vascular and healthy surface.

3. The lids are everted over bone which gives a support upon which to press the flaps. The only unsupported part is the centre. But this will not matter if a sufficiently large

island has been left. After two, or at most three, weeks the outer commissure can be re-united. A V-shaped flap is formed by two incisions passing outwards from the end of each lid and meeting in a point. The flap is dissected up, a glass eye put in which partly covers the flap and the edges of the V united. This not only brings the lids into their former position, but also forms a fornix to the outer side.

Gullstrand gives full credit to May for having introduced the proper principles of making a socket. He also speaks highly of Weeks's idea of making a shell of "base plate gutta-percha." This material is sold in plates 1 mm. thick. A piece can be softened in hot water, moulded to the proper convexity, and when cold trimmed with scissors to the desired shape. He has performed the following modified operations with good results in three cases. His first care is to fix the flap securely to its support, his second to divide all cicatricial tissue so that not a single strand will go round the new fornices. The first point is obtained by using one large flap which is wrapped round the gutta-percha shell, raw surface outwards. The upper and lower borders of this flap are trimmed with scissors and united by two or three sutures. The two ends of the flap are merely wrapped round the shell. The second point is secured by passing the knife so deeply that it can be freely moved in the orbit. After the insertion of the flap and shell, the edges of the lids are temporarily sewn together. In from four to seven days later the lids are again opened. The socket is found closed with epithelium, while the portions of the flap which had lain against conjunctiva are easily removed as a slimy mass.

His success in these cases induced Gullstrand to operate on similar principles upon a case of total symblepharon of the lower lid in which most distressing diplopia resulted from the fixation of the globe. An incision was made inside the edge of the lower lid and along its entire length. This was carried down close behind the tarsus till its lower border was reached. It was then carried more and more deeply, keeping close to the eyeball, until the latter could be freely moved in all directions. A Tiersch flap 6 cm. square was cut from the inner side of the upper arm and laid raw surface down on a shallow porcelain dish. A semi-circular plate of gutta-percha had been previously cut out, and a row of four holes drilled with an awl near its upper straight edge. It had then been softened in hot water and given a convexity to fit the eyeball. This plate, with its concavity down, was laid on the flap, leaving a small portion of the latter uncovered above and a larger portion below. Two sutures each armed with two needles were passed through the flap from beneath, *i.e.*, from the surface which rested on the dish. Their points were then passed through the four holes in the plate. The smaller upper part of the flap was now drawn over the upper edge of the plate, and the needles passed through it. Similarly the lower part of the flap was drawn up over the lower border and the needles passed through it also. The plate was thus completely surrounded by the flap with its raw surface outwards, and four threads, each armed with a needle, projected from the convex surface of its upper border. It was then inserted in the place prepared for it, and the four sutures passed obliquely downwards through the eyelid and tied in two knots. Both eyes were bandaged. After seven days the sutures were removed and the plate taken out. At first there was a little diplopia on looking down, but this gradually disappeared. A photograph taken nine months after operation, with the lower lid retracted, displays a spacious fornix.

Hotz, after describing some of his earlier operations, says that since 1899 he has employed May's operation with some modifications. His method applies also to symblepharon. Instead of a glass eye he uses a thin plate of lead. From its pliability it can be made to fit accurately the socket or surface of the globe, and thus keep the flap pressed down all over the surface with which it is to unite. This applies especially to the canthi, which a glass eye does not usually reach. He operates first on the lower lid, and a month later on the upper. For the lower lid, he takes a half-moon-shaped piece of lead, rounds off the corners, and makes five holes along its upper straight edge. After he has sufficiently freed the lid and removed all cicatricial tissue, the lead plate is put in, to see if it fits, and is trimmed if necessary. An epidermis flap is shaved off the upper arm, and floating in normal salt solution on the blade of the razor is transferred directly to its place. The lower lid, meanwhile, is kept everted by an assistant. The upper border of the flap is united by two sutures to the conjunctiva on each side of the cornea. The flap is smoothed down over the globe, the plate put in, and the root of the flap smoothed over the inner surface of the lid, care being taken that the edge does not anywhere turn in. The lid and plate, with the flap enclosed, are now taken in the finger and thumb of the left hand, and a suture passed through the central hole in the plate and brought out on the surface of the lid. This is tied by the assistant. Sutures are similarly passed through the holes on either side of the centre, and lastly through those at each end. The immobility is so perfect that it is not necessary to bandage the eye for more than three days, but the plate is left in for a week.

In one case this operation was performed directly after removal of a flat melano-sarcoma involving the conjunctiva of the lower lid, and extending upwards in the bulbar conjunctiva beyond the horizontal incision. Eight months later there was a deep fornix and no trace of tumour.

In symblepharon of the upper lid a semi-circular plate would not keep stationary because of the action of the levator. A large lead plate must be prepared with a concavity to fit the globe, and its edges must press into both the upper and lower fornices. It must also be so large that the lids can just be closed over it. If the cornea is intact a circular piece to correspond should be cut out of the plate. The epidermis flap is prepared before, and its lower edge stitched to the bulbar conjunctiva and its surface neatly spread over the globe and everted lid. The assistant keeps the lid everted while the plate is pushed carefully up to the fornix. The lower lid is now pulled down, and the plate slips in like a glass eye. The flap must be kept smooth as the upper lid is replaced. The flap is not sutured, but the lids are sewn together for four or five days. The plate, however, is kept in for at least a week. It can then be taken out daily to be cleaned.

In conclusion, he says that in some of his cases it has been necessary to operate twice, while in others he had to be content with a very modest improvement.*

P. W. Maxwell.

* The reviewer has, with great modesty, refrained from making any reference to his own excellent operation for the restoration of the orbital cavity, published in the *Ophthalmic Review*, Vol. xii., and in a modified and improved form in Vol. xxii.—Ed.

Syphilitic Gummata of the Cornea.

Vinsonneau (Angers). *Archives d'Ophtalmologie*, February, 1905.
Terson (Paris). *Archives d'Ophtalmologie*, May, 1905.

Considerable difference of opinion obtains as to the occurrence of a condition of the cornea, to which the term gumma can be accurately applied. The number of cases published under this title is small, and more than one writer expresses the opinion that the diagnosis of gumma of the cornea should be considered as open to question. In a recent paper on corneal lesions in acquired syphilis (*vide Ophthalmic Review*, April, 1905) Villard reiterates the statement that such a diagnosis is problematical. One of the writers whose papers are before us (Terson), remarks that there seems to be no good reason why the cornea should not be the seat of a gumma. Before Hutchinson's views were published, the cornea was regarded as immune to syphilis; his investigations soon dispelled that illusion. An argument, once considered irrefutable, against hereditary syphilitic keratitis was the fact that acquired syphilis *never* attacked the cornea. Nowadays no one doubts that keratitis in acquired syphilis does occur, though it is not a common manifestation.

In the articles published by Vinsonneau and Terson descriptions of two cases are given, accompanied by the writers' arguments in support of their diagnosis. Those interested in the subject will do well to consult the originals; the clinical notes of the cases are here given in abbreviated form.

Case i. (Vinsonneau). Female, æt. 50; evidence of acquired syphilis undoubted.

Right eye. Slight circumcorneal injection; cornea opalescent, except in upper part, through which the iris, but not its pupillary border, was visible. Two areas of ulceration were present; one near the lower end of the vertical meridian about 4 × 5 mm. in size, with prominent and slightly excavated margins; the other below the nasal end of the horizontal meridian near the limbus, about 3 × 2 mm. In the centre of each ulcerated area was a dirty gray spot, with sharply-defined edges, and seen by artificial illumination to be situated in the corneal stroma. The anterior chamber appeared normal; the pupil was small and reacted sluggishly. Vision was reduced to perception of light.

Active treatment by mercury was adopted, and the first result was a clearing up of the general infiltration of the cornea, leaving only the two gummata; these subsequently disappeared, and at the date of writing there was merely some residual haze of the lower border of the cornea.

Case ii. (Terson). Female, æt. 22, the subject of inherited syphilis. She had been under Terson's care four years previously during an attack of interstitial keratitis of the *right* eye. This attack had not been severe, recovery having ensued after three months' treatment. The evidence as to the inheritance of syphilis was unequivocal.

On November 3rd, 1904, the patient came with slight interstitial infiltration of the *right* cornea, and severe iritis. At the lower part, the corneal limbus and the adjoining sclera were slightly raised and infiltrated as if from a new growth in the angle of the anterior chamber. Under active treatment by biniodide (intra-muscular injections), improvement occurred, and the iritis subsided, but the corneal haze persisted. After some twenty injections, a severe relapse occurred. Swelling of the limbus again appeared, and two yellow infiltrations in the lower part of the cornea became evident. Then near the centre of the cornea a yellow point appeared which in a few days assumed a drop-like shape, its larger end below, and its border sharply defined. This yellow mass grew to the size of a hemp-seed; it was interstitial, and produced a well-marked prominence on the anterior surface of the cornea, and also posteriorly into the anterior chamber. There was no ulceration. At this stage the case was shown to Terson's colleagues, Morax and Antonelli, who "appeared to share his view" of the gummatous nature of the corneal lesion.

Treatment by means of intra-muscular injections of 5 centigrammes of calomel was adopted. Two injections a week were given, and after the second visible improvement was noted, the gumma soon becoming absorbed, leaving a small corneal opacity. Vision of about $^1/_{15}$ was subsequently attained.

Both Vinsonneau and Terson furnish references to previous records of similar and allied cases.

J. B. L.

V. Hanke (Vienna). **A Case of Hereditary Optic Atrophy of Forensic Importance.** *Klinische Monatsblätter für Augenheilkunde*, June, 1905.

The question is perennial as to the influence of a trauma in arousing the development of a malady to which there is a hereditary liability; it does not very frequently arise, however, in connection with eye work, we should imagine, except perhaps in the matter of cataract. In connection with his duty as adviser to a Workmen's Insurance Society, Hanke came across a case of no little interest not only from the point of view of the ophthalmic surgeon proper, but from that of the medical jurist as well. Briefly it is as follows:—A young man (21) presented himself in Profesor Fuchs's clinique on March 15th, 1897, complaining of a very serious failure in the vision of both eyes. He was a worker in a brass foundry, and as part of his work had to clean out the boiler before even it was more than partially cooled, and required to remain from thirty to forty-five minutes in a closely-confined space at a temperature of not less than 30°C. (86°F.). At about the beginning of the year he began to find that after his work, when he emerged again into the cold air, he was apt to notice a fluttering before his eyes, to which at first he paid little attention, and which did not compel him to change his work. But about the beginning of March, after cleaning out when the boiler was still far from cool, he was on one occasion attacked by a transitory and incomplete loss of consciousness. When he came to himself he found that his vision was seriously bad, and now and again for a few moments sight would "go" entirely. The doctor consulted had ordered some application to the eye, but without success—indeed, the patient was quickly becoming worse as regards vision, and had to relinquish his work. At the date of examination he had $^{6}/_{36}$ with the right eye and only $^{1}/_{36}$ with the left; the peripheral limits of the fields of vision were normal, but there was in each eye a central scotoma for all colours. With the ophthalmoscope there was nothing to be seen in the least degree abnormal, save that the veins were unduly full and tortuous. In fact, the case was one of acute retrobulbar neuritis. With its progress from day to day, and with the treatment adopted, we have no concern meantime; it is sufficient to say that no improvement was recorded. The condition, on the other hand, became steadily worse. There did not seem to be any reason to doubt that the neuritis had its origin in the nature of the patient's work; his account of the influence of the changes of temperature, the mode of onset, etc., made a consistent whole, and there was no indication whatever of such other possible causes as syphilis or over-indulgence in alcohol or tobacco. Under the circumstances he (and his fellow-workmen) believed himself justified in demanding from the insurance society permanent compensation to the extent of his wages, and after due consideration Hanke decided, on being officially consulted, that he ought to support this claim, which he accordingly did. Before doing so in a case so unusual, he privately consulted Fuchs also, who agreed with him, he says, in this view.

The discussion, interesting though it is, as to whether the evil result was a consequence of his work or an accidental occurrence which might have been avoided, is a little beside the question with which we are dealing meantime, and to labour the point here would be simply to beat the air, for it is really a legal question which in any case would be decided by the words of the statute. At the time of the trial of the case his vision only amounted to perception of hand movements with the right eye and counting fingers at one foot distance with the left; there was a large central scotoma, and with the ophthalmoscope the discs were seen to be pale, with the vessels of normal calibre.

Now comes the singular part of the case, for in August, 1904, the younger brother of the patient (aged 23), engaged at similar work in the same brass foundry with the patient, came to Professor Fuchs's clinique complaining of loss of vision of four weeks' duration. He had great difficulty in seeing small objects, when attempting to read or write felt as if there was a cloud before his eyes, and had moments of transitory complete loss of sight. The factory surgeon ordered some drops, but not getting better he consulted Fuchs. For the last little while he had suffered, it appeared, from headaches and a feeling of constant weariness and fatigue, and from slight giddiness. His relatives, so far as could be learned, were all healthy people, and the only instance among them of trouble with the eyes was in the case of the first patient. The immediate parents were not consanguineous, nor were any of their ancestors, so far as known. The patient himself was quite healthy looking, and showed no signs of syphilis; he attributed this illness himself to working in a draught. For several months he had frequently had to clean out a boiler, but had not at the time felt any defect of vision or any alarming symptoms of any kind. He also made a claim against his employers. With his right eye he had ability to count figures at 1·5 meters, and with the left very slightly better vision. With each eye he had a large central scotoma, and some reduction of the field concentrically as well. At first the papillæ showed no alteration, but as time went on they became distinctly pale; visual acuteness became rather less than it had been.

With the occurrence of the second case, at once the first naturally assumed a totally different aspect. For, to sum up, we have here the case of two brothers, each of whom was affected at the beginning of his third decade of life with rapid loss of vision, with practically the classical symptoms of "Leber's atrophy"—the headache, the loss of sight, rapid at first, with flashings of light, then becoming almost stationary—the ophthalmoscopic appearances hardly varying from the normal at first, then a certain degree of pallor coming slowly on, primarily affecting the outer quadrant of the disc; the large central scotoma.

The obvious conclusion, according to Hanke, is, then, that he was in error—(a practically unavoidable error)—in regard to the first case, and he publishes it as a warning that others may walk warily. If the legal question had been delayed until the second brother had become affected the conclusion would have been different, but at the first there was no member of the family save the patient who had been attacked, so that the examining surgeon could not possibly have known that things would turn out as they did.

To the reviewer it seems perhaps a little strange that Hanke does not appear to think it possible—he does not suggest the possibility—that the occurrence of the neuritis in two brothers was a mere accident; that here we have two young men both engaged in an occupation such that they were exposed to conditions which we know to be calculated to produce neuritis; it is at least within the bounds of possibility that these conditions may have in both produced neuritis. There may well enough have been in the family some innate weakness which, under favouring conditions, thus exhibited itself. We do not mean that this is probable, but it is not impossible, and Hanke need not have been in so great haste to condemn his former verdict as altogether incorrect. Perhaps the future history of the family may throw some light on the subject.

W. G. S.

HEINE. **The Affections of the Eye Present in Epidemic Cerebro-Spinal Meningitis.** *Berliner Klinische Wochenschrift*, 25, 1905.

IN this paper the author gives an account of the eye affections that may be met with in epidemic cerebro-spinal meningitis, together with an account of one hundred cases that he has personally seen. An account of the literature is also appended.

He divides these affections into three groups, those, namely, of the motor apparatus, of the sensory apparatus, and of the uveal tract.

In the first group the most common affection is one of the sixth nerve; paralysis of all the external muscles is not, however, uncommon. These are practically always due to basilar meningitis. In the third nerve cases the author was unable to determine whether the internal muscles had suffered or not, but ptosis was absent. In slight cases recovery was generally complete, and it was not uncommon for a patient to volunteer the statement that at the beginning of his illness he saw double. Heine says that infrequency of winking was noted by his medical colleagues as an early symptom of some diagnostic value. Nystagmus and alteration of pupil reflexes were commonly met with.

In the second group hæmorrhages in the retina are frequent. The most common lesion of the sensory apparatus is a simple optic neuritis without much swelling of the disc. This is usually the result of basal meningitis, but may also occur as a remote symptom or a descending neuritis. Choked disc is rare, as the internal hydrocephalus is developed with great rapidity, and proves quickly fatal. For the same reason optic atrophy as a result of distension of the third ventricle, is rarely observed. The sudden onset of the blindness in the cases due to basal meningitis is characteristic. This may occur without ophthalmoscopic changes. Sensory defects due to cortical lesions are rare, and only to be diagnosed by the loss of vision, or in some cases by the hemiopic loss, with retained pupil reaction, and negative ophthalmoscopic picture.

In the third group we have usually to deal with a metastasis. Affections of the iris do not usually lead to hypopyon. The dense clouds of vitreous opacities point to marked involvement of the ciliary body and choroid. Pseudo-glioma with detachment of the retina and choroid is the usual result, the eye eventually shrinking. Pyæmic panophthalmitis occurs, and in the pus Weichselbaum's diplococcus may be recognised. In a recent paper on the same subject Foster[1] observed direct infection along the arachnoid in two cases.

In the author's one hundred cases optic neuritis occurred in eight eyes of five patients; unilateral sixth nerve paralysis, four times; unilateral fourth nerve paralysis, once; partial third nerve paralysis, twice; total third nerve paralysis, three times; nystagmus, three times; unilateral panophthalmitis, three times; and bilateral, twice; in one of these last pseudoglioma followed. The author is opposed to the belief that the prognosis as regards life is rendered worse by the occurrence of panophthalmitis.

E. E. Henderson.

[1] Foster. *Amer. Journ. of Med. Sci.*, June, 1905.

Consiglio. **A Case of Sympathetic Retro-bulbar Neuritis.** *Beiträge zur Augenheilkunde*, 63 (May, 1905).

The clinical picture which would naturally present itself to our minds in speaking of sympathetic inflammation is that of an eye with plastic inflammation of the iris and ciliary region; we have had, however, to recognise also cases in which the stress of the attack falls further back, and papillitis, retinitis and haze of vitreous are the predominant features. It would now seem possible that we may have to expand our conception of the disease still further, so as to include cases in which the attack is altogether outside of the eyeball, and affects the optic nerve alone.

Consiglio's patient was wounded in the face by the explosion of a dynamite cartridge in blasting; the left eye was blinded at once; the sight of the right is stated to have "failed gradually."

When seen, five weeks after the accident, the left eye was blind, shrunken and soft, with the scar of a long wound in the limbus extending into the sclerotic at one end. The right eye was quiet, its pupil regular and acting promptly to light; its cornea showed a small scar, at the periphery of the iris was an aperture corresponding to the corneal scar, and in the vitreous could be seen two or three particles of stone and some fine dust opacity. The lens was clear. The disc was perhaps a trifle pale; the fundus otherwise normal. With this eye the patient could only count fingers close to his face; no colours were recognised, and the field of vision was contracted, especially up and out.

Microscopic examination of the left eye, excised seven days after admission, showed many particles of stone in the cornea, some enclosed in scar tissue, others without trace of inflammatory reaction; the iris adherent at its periphery to the cornea, and posteriorly to the remains of the lens capsule; the latter extensively torn; the lens largely absorbed. Some nodules projecting from the iris contained small pieces of stone. The ciliary processes were practically normal, but their surface was covered by a thin layer of newly-formed connective tissue. The vitreous contained much blood and some particles of stone. The vessels of the choroid, large and small, were engorged with blood, but only in a few spots was there any trace of actual inflammation, *i.e.*, exudation of round cells. The retina also was almost free from inflammatory changes.

The most striking pathological appearance in the eye was that presented by the papilla, which was swollen to the height of 1 m.m. by œdematous infiltration of its tissue. Behind the disc the only change was some increase in the neuroglia nuclei; otherwise optic nerve and sheath were normal.

Treatment by injections of strychnine and galvanisation for two months left the condition of the right eye little improved. Fingers could now be counted at 3 m.; the contraction of the field remained, and a central scotoma for all colours could be demonstrated.

The author rejects the idea of direct injury as a cause of the impairment of vision of the right eye, the retina showing no changes nor the papilla any swelling; and considers that a sympathetic retro-bulbar neuritis is the most reasonable explanation of the symptoms.

He has only been able to find one case of similar nature recorded, viz., by Rosenmayer (*Archiv für Augenheilkunde*, xxviii.). In this the left eye was lost by purulent inflammation following the entrance of a piece of steel. After eight weeks it was excised, pain in the head and flickering before the eyes having been present for five weeks. Four weeks later vision of the right eye was $^6/_4$, field and fundus normal. After this pain returned, and the vision began to be cloudy, and in two months was reduced to counting fingers at 2 m. The field was greatly contracted, and the papilla became white, especially on the outer side, this condition remaining up to the date of publication five years later.

It will be evident that both these cases present some anomalous features, and we shall perhaps do well to suspend our judgment as to the existence of a sympathetic retro-bulbar neuritis until others have been recorded.

W. G. L.

W. Christ. **The Etiology of Croupous Conjunctivitis.** *Beiträge zur Augenheilkunde*, 63 (May, 1905).

Much to be desired in relation to membranous conjunctivitis is a rational nomenclature. We are inclined at the outset to cavil at the author's use of the term "croupous;" a name with a century of controversy behind it, which even now means one thing to one man and another thing to another, and which has had to be wrested entirely from its original meaning to apply it to its present purpose, seems better avoided. But after all the best means towards the settlement of the controversy is the collection of a sufficient number of clinical observations to form a firm basis for classification, and the author has done good service towards this end in the careful record of his cases. We give a full summary of them here:—

Case i. The child (the age is not more definitely given, except in one of the cases) had had the left eye inflamed for several days. The lids were bluish-red, and greatly swollen, but could be everted; the tarsal conjunctiva was covered by a grey uniform membrane, the upper more thickly than the lower; it could be easily removed without causing bleeding. The cornea was intact. The pre-auricular gland was swollen; there was slight fever; the throat was normal at first, but afterwards became inflamed. The membrane-producing stage lasted about eight days, giving place to one of muco-purulent discharge with falling of the temperature and improvement in the general health, but at the same time, or a little earlier, a diffuse opacity of the cornea appeared, most marked towards its centre. The secretion lasted a week, leaving the conjunctiva red, but otherwise normal; but the opacity of the cornea was still present when the child was seen two months later. Bacteriologically, there were found staphylococcus albus (in small numbers) and diphtheria-like bacilli; a pure culture of the latter obtained from the throat and injected into a guinea-pig produced no reaction.

Case ii. This child was brought with a moist pustular eczema of the eyelids and adjacent parts of the face. The upper lids were bluish, much swollen, and when everted gave exit to a gush of pus. The conjunctival surface was covered by a greyish-white tough membrane, which could only be removed with much difficulty and bleeding, and which was rapidly renewed. There was no membrane on the lower lids; the corneæ were clear. There was severe rhinitis fibrinosa, swelling of glands, and somewhat later angina with broncho-pneumonia and high fever. Three days after admission diffuse opacity of the corneæ was first noticed; it increased during the next ten days, and then gradually cleared, but it had not quite disappeared when the child left the hospital. Membrane formation lasted about eight days, and then rather suddenly gave place to a catarrhal discharge. Cover-glass preparations showed diplococci, and slender bacilli lying end to end. The membrane produced colonies of staphylococci and of diphtheria-like bacilli; the latter gave Neisser's staining reaction, and when injected into a guinea-pig the latter died in four days, with swollen supra-renal glands, and a pure culture of diphtheria bacilli was obtained from the infiltrated tissues around the seat of injection.

Case iii. This was a child of 2½, whose right eye showed much swelling of the upper lid; the conjunctiva was greatly swollen, and covered by a thin, easily detached membrane; there was considerable muco-purulent discharge; the cornea was hazy. Next day the membrane was thicker, and extended to the fornix, where it was firmly adherent. The cornea became more and more infiltrated, and from the third day began to break down, and the eye was lost. There was considerable fever with the inflammation of the eyeball. Bacteriological investigation showed a practically pure pneumococcus infection, only two staphylococcus colonies appearing in the agar culture; the membrane itself was full of pneumococci. The other eye remained unaffected, though no special means were taken to protect it.

Case iv. The history given in this case was that eczema of the face and purulent discharge from the nose had existed for a fortnight and inflammation of the eyes for some days. On admission the lids of both eyes were swollen, but not tense; the conjunctiva was very red and swollen, the parts of it nearest the lid margins were covered by a very thin, ragged, easily removable false membrane. The conjunctiva bulbi was injected and chemotic, but showed no membrane. The corneæ were clear. After four days the formation of membrane, which was never very pronounced, ceased altogether, and the other inflammatory symptoms rapidly diminished. On the sixth day after admission sore throat and considerable fever supervened, which lasted for some time; but a fortnight later the child was discharged well. Blood serum cultivations showed numerous colonies of staphylococcus pyogenes aureus, and among them very small round transparent colonies of a diplococcus, which could not be obtained in pure culture.

In a fifth case, not seen by the author, but in which the products were investigated by him, there was a toughish glassy membrane in the upper and lower lids of both eyes, which began to clear up after four days, complete recovery taking place. In the secretion were diphtheria-like bacilli, which, however, gave no reaction when injected into a guinea-pig.

The treatment in all cases consisted in cold compresses, frequent washing out with weak antiseptics, and dropping in of 2 per cent. protargol. When the cornea was affected warm applications and pilocarpin drops were employed.

In Cases i., ii., and iii. anti-diphtheritic serum was injected, without any marked result on the course of the disease.

Commenting on Case ii., the author says: "In spite of the positive finding of virulent diphtheria bacilli we must count this case from its clinical course as belonging to the class of croupous inflammation of the conjunctiva, for the mere presence of this irritant is not sufficient justification for the diagnosis of 'diphtheria of the eye.'" Yet, on his own showing, the child was severely ill, and its lids were covered by a thick resistant and constantly renewed membranes in which true diphtheria bacilli were present in preponderating numbers. The condition of the urine, which might have helped in deciding the question, is not mentioned in this or in any of the cases.

His general conclusion is that "croupous conjunctivitis is a *clinical* entity, but that the present state of bacteriology neither supports this view of it nor affords any practical means of distinguishing etiologically between the different types of the disease."

W. G. L.

H. Villard. **Tuberculosis of the Conjunctiva.** *Annales d'Oculistique,* April, 1905.

In this memoir, which was awarded the Laborie Prize for 1905 by La Société de Chirurgie de Paris, Villard treats the subject in as complete a manner as its importance deserves. The author commences his paper with an historical review of the earliest work done in this lesion, and incidentally points out the curious fact that tuberculoses of the chorioid (Jager, 1885, and Manz, 1863) and of the iris (Gradenigo, 1870) were known earlier than tuberculosis of the conjunctiva, about which Koester recorded cases in 1873, followed by communications from Sattler, Walb, Hock, Herter, Haab, Manz, Milligan and Falchi. In 1882 Hesseling, of Bonn, presented a thesis based on seventeen cases. Up to 1884 the diagnosis was made on clinical or histological grounds, but in this year Parinaud used inoculation on animals as a final proof of the tubercular nature of a case under his care. From this time observations and reports on the disease became numerous.

Under etiology, Villard comments on the rarity of the disease, which is usually primary. Mules noted one case in 33,000; Eyre, 1 in 3,000; Hirschberg, 1 in 6,000; Bock, 1 in 10,000; Lagrange, 2 in 15,000; and Milligan, 1 in 20,000. Villard has found 125 recorded cases on which his treatise is founded. As to age, 43·6 per cent. of published cases occurred in the first decade, 29 per cent. from eleventh to twentieth year, and 80 per cent. before thirtieth year. Sex, race, hereditary antecedents do not reveal anything important. Most of the patients observed were in robust health.

Traumatism as a cause is dismissed as unimportant, inasmuch as there were only two cases (Stutzer and Lagrange) in which such might have been the origin.* Six cases were reported in which direct infection might have been the cause of conjunctival tuberculosis.

Villard is not a supporter of the endogenous origin of this lesion, as 60 per cent. of the published cases were clinically primary, there being no initial tubercular lesions discovered after careful clinical examination.

Some authors, Vieusse in particular, put forward as a not infrequent cause of tubercle of this conjunctiva, tubercular disease of the nasal mucosa, the lacrymal passages acting as the intermediary. Villard has found very few notes in this direction, most authors having omitted to make the necessary examination, but he considers that such should be done in all cases of tubercular disease of the conjunctiva. Experiments do not seem to afford a strong case in favour of exogenous origin of the disease.

According to Virchow and Valude inoculations of the Koch bacillus succeeded only when the infections were sub-conjunctival. Surface inoculations always gave negative results. For this reason Valude and Bach believe in the microbicidal action of the tears, but Gourfein has disproved this experimentally and clinically.

Burnett thinks that phlyctens are the most probable seat of infection, which is at variance with the figures of Villard, who found 70 per cent. of the cases were palpebral and 22 per cent. bulbar.

Villard considers Fuchs' hypothesis the happiest one, viz., that there are constantly present minute traumatisms of the palpebral conjunctiva—epithelial abrasions—caused by small foreign bodies, which particles may themselves carry the tubercular poison.

Having described minutely the symptomatology of the disease, the author concludes this first part of his paper with a reference to the prognosis, in which he expresses himself as holding favourable views on the effect of treatment, at the same time pointing out the danger of losing the eye (*e.g.*, from perforation of sclera), or of a general tuberculosis being set up, of which there are many examples in the cases collected by him.

H. C. Mooney.

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* For an interesting case recorded by Dor, in which trauma was the cause of a tubercular infection of the cornea, see *Revue Générale d'Ophtalmologie*, vi., 1903, and *Ophthalmic Review*, 1903, p. 284.

CLINICAL NOTES.

Suturing the Sclerotic in Mules's Operation.—Instead of drawing the smooth, glossy, and apparently non-vascular inner surfaces of the sclera together by simple sutures, Thomson (New York) employs what is known as the Lembert stitch. Three main sutures are first introduced by him in such a way that when they are tied raw episcleral tissue to the extent of 3 m.m. on each side is folded in and brought together. As many other Lembert sutures as are deemed necessary are then put right through. He is careful to round off the stump at each end of the line of sutures, and owing to the fact that the muscles are by his procedure placed at a greater advantage than in the ordinary method, the subsequent mobility obtained is greater. Weekes (New York) employs a stitch, which he passes from without in, and then from within out on one side of the gap, and then from within out only on the other. When this is tied one lip of the wound slides over the other, and the two surfaces (one being the former interior and the other the former exterior face of the sclera) have a broader and firmer union than when edges merely are in contact.—*Ophthalmic Record*, March; and *American Journal of Ophthalmology*, March.

Ossification of the Lens.—Of this extremely rare transformation Roure (Valence) reports two examples; deposit of lime salts may be common enough in degenerated lenses, but of true bone formation the author was only able to find in literature nineteen cases. The first of Roure's patients was seen by him in 1896; he was then a child of five, who exhibited cataract of a strange yellowish-white aspect; two years later another surgeon saw him and recommended extraction of the lens, but as there was no perception of light present this was not done. At the age of twelve he received a blow on one eye, however, which subluxated the lens of the left eye and caused great pain and distress; it was therefore decided to extract the lens. A lateral section was made with the keratome for the purpose of removing it by aspiration, but without result; the cystotome scraped upon the capsule without lacerating it. An attempt to lacerate the capsule with a Graefe's knife resulted in dislocation of the lens into the anterior chamber, from which position the hard calcareous mass was with considerable difficulty removed. On removal the lens was found to be not flat, but highly convex, as a child's lens ought to be; it was 8 m.m. in thickness and as hard as stone. Examination revealed its composition in two portions,—a thin hard yellowish layer through which the knife could hardly be passed, evidently corresponding to the capsule, and an interior, very white, fine grained substance exactly like chalk. To chemical examination the lens was almost entirely composed of mineral salts, largely phosphates with a small proportion of carbonates. Both in the capsule and in the lens itself the microscope revealed abundance of bone corpuscles. On examination of the fundus after extraction the author came to the conclusion that bone was also in process of formation in the choroid.

The other patient was a girl of 16, whose left eye had always been smaller than the other; as it had begun to cause serious annoyance to its fellow it was excised. A state of affairs in the lens very similar to that present in Case 1 was discovered; in this instance also bone had also begun to form in the choroid.—*Revue Générale d'Ophtalmologie*, February 28th.

SPONTANEOUS EMPHYSEMA OF THE LIDS.—Desbrières and Grenier relate an example of one of those rare cases of employment of the lids apart from trauma; it was that of a man of 28, whose personal and whose family history revealed nothing abnormal. In particular he had no lachrymal or ocular ailments, and no old fracture of bones; his only trouble was that of a too frequent need for use of the handkerchief. A few days before the authors saw him he had been blowing his nose, possibly a little more vigorously than usual, when suddenly his upper lid became swollen and hung down. He was examined within a very short time of the occurrence taking place, when the lid was greatly swollen; it contained no effused blood, however; fine crepitations were to be felt. Anterior rhinoscopy revealed nothing abnormal, and a probe passed along the lachrymal tract occupied its normal position. After some five days or so the eyelid, under treatment by simple compresses, had returned almost to its usual condition, crepitation was gone, and the palpebral aperture was as wide as that on the other side.—*L'Ophtalmologie Provinciale*, May, 1905.

A NEW EYE SYMPTOM IN EXOPHTHALMIC GOITRE.—Besides the retraction of the upper eyelid, and its imperfect descent when the gaze is directed downwards, and the infrequency of the act of involuntary winking, Teillais believes that he has noticed as a symptom sufficiently constant to be included as one of the regular manifestations of exophthalmic goitre a certain abnormal brownish pigmentation of the eyelids. The area affected is the whole skin of the lids up to the margin of the orbit, but the coloration penetrates no deeper than the skin, and is never present in the conjunctiva. He finds in this pigmentation a support for that theory of the causation of Graves' disease, which attributes it to an error in the function of the thyroid gland, rather than to any nerve lesion, whether bulbar or sympathetic. That some of the subsequent symptoms may be caused by disturbance of the nerve-stability is of course perfectly true, and it is impossible to deny the importance of these abnormal nerve excitations in the development of the disease. Perhaps the two theories are not altogether incompatible.—*Archives d'Ophtalmologie*, May, 1905.

OPHTHALMIC CAPSULES.—Messrs. Duncan and Flockhart have put on the market what strikes one as a very convenient arrangement for the supply of ointments for use in ophthalmic surgery. They make up small quantities, about 20 grs. or more, of ointment of the yellow oxide of mercury, for example, in a little gelatine capsule, one end of which is prolonged into a neck. When the ointment is required, the neck is cut across with scissors and the ointment can be squeezed out; it will be all used before it has time to go "bad" and another capsule employed if necessary. The capsule being quite soft and flaccid, no injury can be done to the eye even if the cut end should touch the cornea by chance. There is no metal in contact with the ointment, nothing but the purest gelatine, so that no decomposition can occur. The samples submitted to us were made with paraffin jelly, but any other base may be employed as desired. The one objection which occurs to one is that such substances as undergo chemical changes when exposed to light are not protected from its action, but this is a difficulty which in such cases can easily be got over. Messrs. Duncan and Flockhart are to be congratulated on having introduced an elegant and hygienic method into the handling of ointments.

Arecolin.—On first introduction of a 1 per cent. solution of arecolin into the conjunctival sac there is a decided sensation of smarting, with lachrymation and spasmodic closure of the lids, but that passes off, and in a couple of minutes spasmodic contraction of the iris can be seen, the pupil visibly diminishing; after about an hour the pupil is again of normal size. Spasmodic contraction of the ciliary muscle seems to occur in similar fashion, and to pass off again in half an hour. Under normal conditions the tension of the eye is not lowered, but a few writers, including Chetwood-Aiken and Cross, have found arecolin of service in cases of glaucoma which had not been favourably influenced by eserine. Santos-Fernandez (Havana) describes three cases—one of recurring glaucoma, one of increasing staphyloma of cornea after a destructive ulcer and one of advancing buphthalmos, in which it seemed quite certain that the persistent use of arecolin not only checked the distension of the globe, and its increase of size from rise of tension, but actually caused it to diminish in volume. If he is right, arecolin may prove a very useful application in some such cases, but one to be employed with caution also.—*Recueil d'Ophtalmologie*, March, 1905.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

The President, Mr. John Tweedy, in the Chair.

Meeting held July 7th, 1905.

Papers.

Tubercle of the Iris.—Mr. M. S. Mayou.

This paper had reference to tuberculosis of the iris in general, but more particularly to the case of a boy, aged 3 years, who had tubercular dactylitis previous to the appearance of the tubercular mass in the iris and also at the time this actually appeared. The writer considered that all these cases were secondary to tuberculous trouble elsewhere. In this case the cornea had been invaded, the lens capsule had ruptured spontaneously and several masses of exudation had appeared in the retina. Very considerable cicatrization in the retina, the iris itself, and at the angle of the anterior chamber, had taken place. Lantern slides were also shown illustrative of the above case.

Sympathetic Ophthalmia (severe). Recovery of Perfect Sight in the Exciting and the Sympathising Eyes.—Mr. Simeon Snell.

This case occurred in a man aged 38, whose left eye had been injured by a sharp piece of metal causing a large wound of the cornea; this wound extended into the ciliary region and resulted in a prolapse of the iris and consequent incarceration of it in the wound. The patient had not been seen until eleven days after the accident, but then the iris had been freed from the lips of the wound, which rapidly and completely healed. The injury was received on September 8th, 1904, and on October 12th the right—the uninjured eye—was noticed to be red, and five days after there was well-marked iritis, and the case was noted as one of severe sympathetic opthalmia. A month later the iritis settled down, the iris becoming free; the congestion, redness and pain of the eye began to lessen, and the result after some months was a completely healed eye with vision $^6/_5$ and Jg. I. with both the exciting and the sympathising eye. Since this no further trouble had been complained of. In the discussion which followed Mr. Snell stated that he had not the least doubt but that this was a genuine case of sympathetic ophthalmia which fortunately had ended much better than most of such cases.

Cases of Sympathetic Ophthalmitis arising after Enucleation.—Mr. Simeon Snell.

Three cases were recorded by Mr. Snell in which sympathetic ophthalmitis had come on after excision of the injured eyeball at various times after the receipt of the injury. and reference was made to a case reported by himself in the *Ophthalmological Society's Transactions* foı 1882, Vol. ii., page 19), in which an eye, injured by a piece of steel which had remained within the globe, was enucleated eight weeks after the accident, and subsequently sympathetic ophthalmitis developed in the remaining eye, 32 days after the enucleation had been performed, and 106 days after the receipt of the injury. In this particular case Eserine had been instilled in the sympathising eye to allay the irritation but had apparently acted in the reverse manner, causing a sudden outburst of inflammation in an eye suffering only from subacute sympathetic irritation. In these four cases referred to one had been a mild attack and had recovered, three had been severe, and two of the eyes had become totally blind.

A further instance of Glioma in more than one member of the same family.—Mr. Simeon Snell.

This was the case of a male child aged $2\frac{1}{4}$ years, in whom glioma was found in each eye. The only other child of these parents was a girl, born in 1897, who was similarly affected with glioma in each eye; in her case death had resulted.

Only some three other observers had placed similar cases on record, and the writer referred to a paper, which he had read before the Society last year (*Ophthalmological Society Transactions*, Vol. xxiv., 1904, page 230). In this case a child aged 4½ months was found to have glioma in the right eye, which was thereupon removed, and the microscopical examination confirmed the diagnosis. It was then found out that one of the patient's brothers had suffered from glioma of both eyes which—the parents not consenting to an operation—had been perforce allowed to run its course, with the result that each growth fungated into an enormous mass protruding from each orbit, extending down the face and reaching almost to the mouth, so near in fact that the child could only drink out of a cup by throwing its head far back. The child was born on October 5th, 1899, the glioma was first noticed in the right eye a year later, and a few months after this glioma was found in the left eye, still a year later both growths were of such a size as to preclude any operation, and on February 18th, 1903, the child died.

Another case of glioma first in one eye and then in the other, reported at the same time, had done well since removal of both eyes, the patient being at the present time in good health.

Microphthalmos.—Mr. R. Cruise.

The patient, the subject of this paper, a young woman aged 24 years, had had a swelling in the left orbit from birth, with a small degenerated microphthalmic eye pushed into the upper and outer quadrant of the orbit. During the last two years this swelling had much increased in size with corresponding displacement of the eyeball. Clinically it was difficult to arrive at a differential diagnosis between a cyst in communication with a microphthalmic eye, and meningocele. The swelling, which occupied the greater part of the orbit was fleshy looking, and fluctuating to the touch. Pathologically a free communication was found to exist between the interior of the eyeball and the interior of the cyst in the posterior part of the globe, and the ciliary body being well developed a free passage of fluid secreted by it took place; this accounted for the increase in size of the swelling during the last two years. The cyst contained spaces in which fluid was present, and for the greater part was filled with a mass of rounded cells. Several lantern slides of the sections were shown.

REGINALD E. BICKERTON.

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ON RETRO-OCULAR NEURITIS.*

By R. Marcus Gunn.

The term retro-ocular or retro-bulbar neuritis is in common use to indicate cases that show evidence of one or both optic nerves being impaired by an inflammatory affection, which exerts its chief influence behind the papilla. The evidence is, as a rule, entirely clinical, and the diagnosis may, for a time, rest solely on the subjective symptoms. But ophthalmoscopic changes nearly always come to our aid, either early in the affection by the neuritis invading the papilla, or after the lapse of some weeks by the optic disc becoming pale. It is only in very exceptional cases that an opportunity occurs of examining the affected nerve anatomically, and then practically always long after the acute stage has passed.

Put very broadly, this discussion is open to a consideration of all cases in which there is evidence of the optic nerve being inflamed, apart from such as are generally recognised and classed as papillitis. But here we are confronted by two questions:—

(1) How are we to recognise a neuritis when the papilla presents a normal aspect?

(2) How are we to distinguish between a retro-ocular neuritis involving the papilla, and a pure papillitis occurring without evidence of intracranial or other disease calculated to produce it?

The reply to both questions must be that we are here dealing with a group of cases clinically recognised by certain definite subjective symptoms, viz.: Rapid failure of vision, often in one eye only, particularly affecting the macular area, and commonly accompanied by pain and tenderness in the orbit. The other chief clinical characters consist in impaired pupil reaction to light, a frequent absence of decided early ophthalmoscopic changes, and a tendency to recovery.

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* Read at a meeting of the British Medical Association (Section on Ophthalmology), introducing a discussion on this subject.

It is not denied that anomalous forms of retro-ocular neuritis may occur without these symptoms, and any evidence of the occurrence of such forms will be valuable. Thus there is no doubt that occasionally an optic neuritis descends, for example from an anterior basal meningitis, involving the papillæ finally. In its earlier course this is truly anatomically a retro-ocular neuritis; but its local intensity before reaching the papillæ is never, so far as I am aware, sufficient to produce the usual visual subjective symptoms, and we rightly class this optic nerve affection as a papillitis.

Some years ago one used to hear of a retro-ocular *perineuritis*, the chief symptom of which was a peripheral contraction of the visual field. A pure perineuritis must be a very rare condition, and I should be glad to have the experience of others on its occurrence. Perineuritis may undoubtedly exist as part of a general neuritis, but the visual field is then involved elsewhere than at the periphery. From the anatomical arrangement of the fibres in the nerve near the eyeball, a true perineutritis in this locality should cause, not peripheral loss of vision, but an increased size of the "blind spot."

Visual symptoms very similar to those above mentioned occasionally occur in affections of the macula, and the differential diagnosis is often difficult during the early stages. In this condition the prominent symptom is rapid central visual failure in one eye, and at first there are no very definite ophthalmoscopic changes, so that there is much clinical similarity between such cases and retro-ocular neuritis. The chief distinguishing feature in the retinal cases is the absence of associated pain; there is also sometimes metamorphopsia, or sometimes a positive scotoma, with possibly a history of recent exposure to excessive light. We frequently find œdema, and small, round, pale yellow spots in the macular region in such a case, but the optic disc usually remains unchanged.

Again, in the early stages, so long as our diagnosis rests merely on subjective symptoms, retro-ocular neuritis is liable to be simulated by functional amblyopia, and we have here to be specially on our guard, because the same type of individual is often liable to both forms of visual affection. A careful examination of the character of the behaviour of the pupil to light should always serve in distinguishing between them; the reaction is invariably impaired when there is even moderate amblyopia from neuritis, while it remains normal in cases of functional origin.

Failure of Vision. The amount of amblyopia varies very much in different cases of retro-ocular neuritis. There may be absolute blindness, for a time at least, in the most severe form. On the other hand, complaint of recent visual failure is occasionally made, even though the acuity is $^6/_6$. In the latter very slight cases the test-letters are generally read slowly and with difficulty, the patient stating that there seems to be a mist obscuring their outline; this difficulty is readily evident on comparison with the other eye, for these slight forms are practically always uniocular. A relative colour-scotoma at or near the fixation point can always be found in these mild cases. Between these extremes all degrees of visual failure may be met with.

The visual acuity in retro-ocular neuritis is less in a very bright light. Previous exposure to an excessive light also leads to temporary deterioration of vision. "I cannot see so well to-day, because the sun was so bright as I came along," or words to that effect, is the spontaneous remark that is sometimes made. This is probably a result of an increased physiological degeneration such as normally occurs, but in the case of ill-nourished axis-cylinders, the process of regeneration is imperfect, and the conducting function remains impaired until this recovery has had time to occur.

Not infrequently complaint is made of seeing objects as through a moving haze, like that seen on a sunny day near the ground. One patient with vision reduced to $^6/_{60}$ graphically described what is probably a greater degree of the same visual state, "Things look jumpy, like figures in a cinematograph." This may possibly be explained by imperfect insulation of the axis-cylinders, from a breaking down of the medullary sheaths—a pathological change which is known to occur in the retro-ocular neuritis of insular sclerosis. Or, it may be that this shimmering effect is due to the fact that the affected axis cylinders, though able to conduct momentarily, are rapidly exhausted; the alternate action and loss of function of contiguous fibres, as they are earlier or later exhausted, may thus lead to confused perception, and an apparent movement, from irregularity in the transmission and central reception of the visual stimuli.

The light-sense as tested by Bjerrum's types is decidedly defective. In health the light-difference appreciation is directly dependent upon the amount of retinal stimulus, but in neuritis another important factor has to be considered, viz., the conducting power of the nerve-fibres along which the stimuli are transmitted. In as far as it is the macular fibres that are mainly involved in retro-ocular neuritis, and contiguous fibres are seemingly not always involved to the same extent, we have, in this combination of testing the form- and light-sense of the fixation area, a particularly delicate clinical appliance.

The power of distinguishing colours is still more profoundly affected in retro-ocular neuritis. This loss of colour sensation may be profound in a very severe case; while, in the slighter degrees of retro-ocular neuritis, there is always a complete or relative scotoma for green and red at or near the fixation point. I need not here recapitulate what I have mentioned elsewhere,* but it will suffice to say that *red* gives little light, and is perceived as a colour practically as soon as it becomes visible; when it is not perceived the object is consequently described as black in contrast with its surroundings; thus in a severe case of neuritis, a patient tells us that the fire looks black. On the other hand, in the case of *green*, there is a marked interval between the intensity necessary for the perception of light, and that necessary for the recognition of colour; in a loss of conduction the light often persists though no colour can be perceived, and the green test-object under these circumstances will be described as white or grey.

Visual Field. The field is lost in varying degrees according to the severity of the affection, but the central portion is always involved (with the possible exception of a pure perineuritis). In the slightest forms, there is merely a small relative colour-scotoma, at or near the fixation point, usually somewhat to the temporal side if paracentral. In the next degree, the loss frequently takes the form of a complete central scotoma for red and green; while in a still graver loss, the central scotoma is absolute, with a surrounding or one-sided further loss for colour. Nettleship has observed that such a defect is often more or less fan-shaped, spreading towards the periphery, though not constantly in the same direction.

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* Bowman Lecture, *Transactions of Ophthalmological Society*, 1900.

The central visual loss is undoubtedly due to interference with the conducting efficiency of the macular fibres. These fibres form a well-marked bundle, which occupies the outer part of the nerve at first, but quickly approaches the centre as the fibres ascend in the nerve trunk, so that they soon reach a median position, which they maintain in the rest of their course to the chiasma. Why should these macular fibres, occupying the central, and what might be accepted as the most protected part of the nerve trunk, be peculiarly liable to suffer in retro-ocular neuritis? There are probably several causes at work, one acting principally in one case, and another in another case. As a preliminary, we must remember that the macular fibres occupy a relatively large area in the nerve trunk, and that a slight interference with their function is easily recognised:—

(1) The principal lymph-current of the optic nerve flows about and, partly at least, towards its centre, in the part of the nerve near the globe. While such an arrangement is doubtless advantageous in a condition of health, it must further predispose the axial fibres to suffer during a pathological process.

(2) The nature of the vascular supply may render the axial fibres prone to suffer. It has been suggested by Silcock that, in the greater part of the nerve, the central fibres are nourished by peripheral blood-vessels, so that any interference with the circulation will react upon them more markedly than upon the outermost fibres, about which the circulation is probably freer. Further, it may be remarked that, in the part of the nerve immediately behind the globe, the axial fibres receive the greater part

of their vascular supply from minute twigs from the arteria centralis: degenerative changes in one or more of these small vessels may account for central axial visual loss in a few instances.

(3) Finally, I have drawn attention to the fact that, in as far as the macular fibres are the most active physiologically in conduction, they will necessarily most rapidly undergo the normal degenerative changes associated with action. Under altered conditions of pressure, and an abnormal character of the surrounding material, the necessary regenerative processes are performed imperfectly or not at all, and consequently they become incapable temporarily of performing their function, and may break up permanently if not timeously relieved.

One of the distinguishing features of retro-ocular neuritis is the *rapidity* of the visual failure. This is in contrast with the length of time that a papillitis may exist without the nerve function being affected, and with the usual very gradual failure when this does occur in the latter. But though rapid, the failure is never *sudden* in pure retro-ocular neuritis, which again is in contrast with what obtains in arterial embolism or thrombosis, and in hæmorrhage into the optic nerve-sheath. As a rule, the vision gradually fails for about one to three days, when it reaches its maximum, and then remains stationary, for some time at least. The commencement of recovery is seldom long delayed, the improvement is generally steady and very gradual, the final result being commonly reached in about six weeks from the beginning of the attack. Even in severe forms of retro-ocular neuritis there is much more tendency to recovery than would be expected, judging from our experience of other optic nerve lesions. At the same time, there are exceptional cases in which no recovery has taken place, even when the initial loss was slight, and others where there is a liability to recurrences, so that ultimately the visual result is disappointing. In regard to this question of prognosis I shall have some further remarks to make presently.

Pain. More or less pain referred to the back of the eyeball, and also to the neighbouring part of the head, is present in a very large percentage of the cases. This usually precedes the loss of vision, and frequently disappears, or becomes greatly less, at the time that visual failure is first observed. When deep-seated orbital pain persists, the prognosis as to recovery is usually less favourable, indicating in all probability a gross periostitis at the optic canal. There is also present in many cases tenderness on pressing the globe backwards into the orbit, and on muscular movements of the eyeball. This tenderness is not uncommonly met with even in those with a slight degree of visual loss, and its presence, so far as it has *cæteris paribus* any prognostic value, is favourable, being particularly marked in forms accompanied by early papillitis, *i.e.*, where the nerve is affected near its ocular end. Pain or tenderness is met with even in cases occurring early in *insular sclerosis*, an observation that is so far in favour of the optic nerve affection in these cases being, at least sometimes, of an inflammatory or irritative character. As some indication of the frequency of pain in cases of retro-ocular neuritis, I may state that it was sufficiently severe to be specially noted in 120 out of the 350 cases that have been collected for this series of observations.

Ophthalmoscopic changes. (1) Comparatively early changes in the optic disc, of a more or less inflammatory character, occur in a considerable number of cases, but they are usually first found some days after the earliest visual failure. They vary greatly in degree, from a slight haziness of the disc-edges with fulness of veins, to a decided papillitis with measurable swelling and occasionally retinal hæmorrhages. The slighter degrees are much the more common, and all such changes, when present early, indicate proximity of the affected part of the nerve. The presence of papillitis, even in an intense degree, does not preclude a favourable visual result, and slighter degrees have a relatively good prognostic significance, since the proximal neuritis so indicated is less deleterious than a distal inflammation attacking the nerve in the narrow optic canal. Comparatively early disc-changes of an inflammatory character were noted in no fewer than 101 out of the 350 cases.

(2) Pallor of the disc is, I believe, practically universal

as a sequence of retro-ocular neuritis. It may be merely a slight loss of tint in the outer third of the disc, that might, in a uniocular case, pass unnoticed, unless carefully compared with the other healthy nerve; its presence, even in a quite decided degree, is not incompatible with full restoration of vision. I have seen the whole disc pale as in a simple atrophy, with normal visual acuity, and a perfect field except for a small relative central colour-scotoma. It is impossible from the data at my command to give any real statistical seal to the opinion that pallor nearly always follows an attack, since a considerable number of the cases were not seen at a late stage. The occurrence of pallor or of late atrophy was noted in 174 of the 350 cases.

In severe forms, with an unfavourable visual result, the disc ultimately becomes atrophic, though the disc-changes may take several weeks to appear where the nerve has been affected at a distance from the eyeball. As a rule, the disc in such cases presents the appearances of a simple atrophy; where there has been a previous papillitis, however, the atrophy may be of the consecutive character. In insular sclerosis with much involvement of optic nerves, the succeeding condition of disc is not infrequently less white than in ordinary atrophy, the disc presenting a dead opaque appearance, with a faint pink tinge over the inner half, and the remainder dirty white, a condition resembling the so-called "waxy atrophy" of choroidal and retinal disease, but without the great constriction of the larger retinal vessels.

Etiology and Pathology. The class of cases which we are considering is not a large one, but it presents unusual difficulties in some respects, particularly from the varied and frequently obscure etiology of the attacks in different cases. An absence of accurate anatomical knowledge of the changes which occur, except perhaps in those met with in insular sclerosis, is a further source of difficulty. In some forms of the affection there is undoubted inflammation, while in others the actual presence of neuritis is a matter of speculation. Thus, even in insular sclerosis, where a considerable number of optic nerves have come under pathological investigation, authorities are much divided as to the character of the initial changes, and the etiology remains exceedingly unilluminated. Be that as it is, however, the term "neuritis," in our present state of knowledge, fits in best with the clinical characters presented.

The optic nerve is undoubtedly peculiarly prone to disease. As an integral part, though an outlier, of the central nervous system, it partakes of the susceptibilities of this system, while at the same time it has the exposures of a peripheral nerve.

A thoroughly satisfactory classification of cases of retro-ocular neuritis according to causation I have found impossible, from the way in which they seem to overlap, but there can be no exception taken, I think, to the first class, viz.: —

Class A. *Inflammation communicated to the nerve from neighbouring structures.* In the last part of its course the optic nerve may be attacked during an *orbital cellulitis*, arising from local injury, or by the extension of erysipelatous or other inflammation from adjacent parts. Sometimes, though rarely, an orbital cellulitis follows great exposure to cold. Thus a patient came with optic atrophy and complete blindness of one eye, following much orbital pain and swelling, after being exposed in the great blizzard of 1881.

In cellulitis cases, later changes in the disc often show that the nerve must have been inflamed at, or very near, its intra-ocular end. This type of neuritis is very severe in its effects.

Orbital periostitis, accompanying local disease of bone, or spreading from the upper jaw or nasal cavities, may involve the optic nerve, probably by invading its dural sheath at the optic foramen, where the sheath and the periorbita are continuous. To this group probably belong cases following alveolar abscess; the inflammation may readily gain the orbit by the spheno-maxillary fissure. The character of the neuritis is usually severe, though occasionally excellent vision was ultimately regained where there was reason to regard the neuritis as of this causation.

In its passage through the *optic canal*, about 1 cm. in length, the nerve is exposed not only to inflammation extending to it from the surrounding bone and its periosteum, but also from the sphenoidal sinus, separated from the canal only by thin, sometimes imperfect, bony laminæ. Where retro-ocular neuritis is secondary to disease of the nasal mucous membrane, the nerve is probably attacked in this way, as well as in a considerable number of the cases traceable to exposure to cold. Both nerves are often affected at the same time, or almost simultaneously, and the first loss of field is central and temporal in these sphenoidal cases. As a rule, the first change at the disc in all deep cases is a secondary atrophic pallor. Vision is profoundly affected, and when recovery occurs it is rarely complete. The periosteum in this locality seems to be often the seat of syphilitic disease. In cases of deep orbital inflammation, it is not uncommon for ocular motor nerves to be also involved.

Cases of retro-ocular neuritis at the optic canal may be compared with those well-known instances of inflammation of the portio dura in its bony canal, many of which are attributed to rheumatic inflammation of the sheath; some of these cases also are due to an extension of inflammation from a neighbouring cavity; while in other cases recurrences have been observed associated with peridental abscess, so that there is a considerable analogy between Bell's paralysis and this group of retro-ocular affections. Further, it is noteworthy that a considerable number of cases of retro-ocular neuritis have been observed in which the portio dura also was affected, though not necessarily at the same time. It occurred in no fewer than 17 of the cases now reviewed.

I believe that there is another group that ought to be included in this class, viz.: of cases where there is reason to believe that the inflammation is communicated to the optic nerve close behind the papilla, probably in the *scleral opening*. It is highly probable that cases with very early papillitis, occurring in gouty and rheumatic individuals, have an inflammation of the sheath of the nerve in this locality, viz., where it joins the sclerotic; and that we have here to deal with a condition at the back of the eye, similar in nature to that with which we are familiar as an episcleritis when it occurs in the exposed portion of the globe. In a few instances the patient suffered from ordinary episcleritis before or after the optic nerve attack, and in other cases a brother or sister had been seen with episcleritis or other allied affection. From this point of view, it is incumbent upon us to regard some of the family cases of retro-ocular neuritis (I of course do not refer to Leber's cases), not as instances of a family tendency to idiopathic affections of the nerve, but as showing the same arthritic inheritance.

Of the 350 cases on which this paper is based, 111 belong to Class A. In 17 of these, the cause was gross orbital cellulitis. For our present purposes this is an unimportant group, and I may dismiss it at once.

The neuritis was attributed to periostitis at or near the apex of the orbit in 23 cases. This includes cases with a syphilitic history, but does not include those in which the symptoms followed exposure to cold, or in which the inflammation had probably spread from alveolar abscess. Of these 23 cases, papillitis was only noted in 6. The visual loss was severe in all, but good sight was regained in 8. Pain was a prominent symptom, and is noted particularly in 12 cases.

Exposure to cold was the most probable cause in 36 cases; 16 of these had decided papillitis. The visual loss was severe in no fewer than 28, but the ultimate recovery was good in 20. In 2 cases both eyes were affected.

Inflammation, spreading from abscess at the roots of teeth, seemed to be the most likely cause of retro-ocular neuritis in 17 of our cases. The visual loss was severe in 12, and noted as slight in the remaining 5. The recovery of sight was noted as good in 7 cases; and as bad, also in 7 cases.

Eighteen cases were diagnosed as probably due to disease of the sphenoidal sinus. In 11 of these both optic nerves were involved. In nearly all (*i.e.*, in 16) there was great loss of vision, and the after-result was good in 6 cases only, *i.e.*, in one third of the total number.

The other great class into which I shall subdivide cases of retro-ocular neuritis is

Class B. *Inflammations or other rapid changes occurring initially in the optic nerve.* This class consists of two sub-classes; one small, the other large and ill-defined.

(1) The small sub-class includes examples of local manifestations of a general disease, and I shall confine it to cases of gummatous inflammation, and tuberculous deposits. In none of these cases now under review was there sufficient clinical evidence to diagnose *tubercle* as the cause. It occurs very rarely in the optic nerve proper, probably then at or near the papilla mainly. More commonly, tubercle affects the chiasma and its immediate neighbourhood. There was reason for believing in the presence of *gumma* in one optic nerve in 16 cases. In half of these definite papillitis was noted; and, in all but one, there was severe loss of vision. The final visual result was good in 9.

(2) Finally, we have the large, very heterogeneous sub-class in which I place all the remaining examples of retro-ocular neuritis, *i.e.*, all those in which there is no indication of the nerve having been affected from adjacent structures, and where there is no real clinical evidence of local gumma or tubercle. For these cases we may use the term "Primary," meaning simply thereby that the condition is not secondary to surrounding inflammation.

In this sub-class we have the important group of cases where the optic nerve is affected as part of an insular sclerosis of more general type; but as this disease at present permits of no precise etiology, we shall put it on one side for the moment and consider the other cases. Before doing so, however, I would draw attention to the large percentage of these primary cases that seem to belong to the insular sclerosis group. Thus I have notes of 223 cases of what may be classed as primary retro-ocular neuritis, and no fewer than 51 of these belonged to the insular sclerosis group.

Considering then the remaining 172 cases, I find that they have been attributed to somewhat various causes, while in no less than 55 the causation has been quite obscure. We are thus left with 117 cases of primary retro-ocular neuritis, where some etiological diagnosis was made, exclusive of insular sclerosis.

Of these, influenza accounts for the largest number (of all the single causes), viz., 27; while in 22 a strong gouty history, and no other evident causation, rendered this the most probable etiology. Influenza and gout account then for 49, so that we have now 68 cases remaining. Not to exhaust your patience indefinitely with statistics, I may state that intestinal affections (including ptomaine poisoning and very obstinate constipation) are credited with 5; disorders of menstruation, 5; blood disorders (including malaria) 11; arterial disease, 11; and mental or traumatic shock, 20; while the remaining 16 cases are attributed to various forms of ill-health. Of these I may mention the cases of two sisters, who both had retro-ocular neuritis after a revaccination; they were not vaccinated at the same time, not even in the same year, so that the quality of the lymph cannot reasonably be held responsible. This occurrence affords an instance of family neuropathy, of which there are several other examples in the list.

What I think must impress one in this enumeration of causes is the seemingly toxic character of most of them, the toxins being possibly either a product of a specific disease such as influenza, or due to some faulty visceral chemistry such as occurs in the gouty. The effect of shock is often marked, possibly acting either by depressing vitality and interfering with the elimination of a poison, or by actually indirectly occasioning the formation of a toxic product by disturbing digestive or secretory processes. Whether such a poison induces primarily an inflammation must, I presume, remain undecided. It is possible that in some of the slighter forms of the affection under consideration, the first occurrence is an œdema, analogous to the cases of acute swelling of the eyelids with headache that we occasionally meet with as the result of what is called "an error" of digestion. Time does not allow me to say more regarding this group, and I must now very shortly consider the 51 cases of retro-ocular neuritis occurring in connection with insular sclerosis.

In favour of the optic nerve-affection in insular sclerosis being of a truly inflammatory nature, it may be noted that in all these cases the visual loss was rapid; but, still more important, actual papillitis was recorded in 12, and localised pain in the orbit in 10 cases. In as far as the pathological appearances presented in sections of the optic nerve in this affection are identical with those found in patches of the disease elsewhere, it is important to bear in mind this clinical feature of inflammatory invasion. The leading anatomical change in insular sclerosis is a degeneration of the myelin sheaths of the nerve fibres, occurring in patches or islands in different parts of the central nervous system, associated with a hyperplasia of the neuroglia fibrils. It has, I believe, been assumed by many pathologists that the initial change is a parenchymatous degeneration, and that the increase of connective tissue is secondary. Such a degeneration, occurring rapidly, would quite account for the visual failure, but it is less clear how it can occasion surrounding changes associated with pain and ophthalmoscopic evidences of inflammation. Is it possible that in some cases, or in some patches, there is a rapid general change worthy of being called inflammatory, while in others the process is a more gradual, though still quick, simple degenerative one? We are only here dealing with the acute forms of optic nerve change, or I might mention those other slow atrophic changes at the disc that we not infrequently find in insular sclerosis, sometimes, but not always, with the history of a previous acute attack. The etiology of insular sclerosis is at least as obscure and difficult and diverse as in our other group of primary retro-ocular neuritis, and it is interesting to note in a recent paper on the subject how nearly the supposed causes correspond with those given for our non-sclerosis group. It is stated, for example, that a tendency to insular sclerosis may be inherited, and that it may also be "acquired from various states which cause increased stress or impaired resistance"; these latter causes are subdivided into (a) *pathological*, such as infectious diseases, chronic intoxications, etc., and (b) *physiological*, such as puberty, pregnancy, etc.

Many of the cases in my list were not observed during a prolonged period; of those that were, several ultimately proved to be insular sclerosis where there was no reason to suspect at first that they were of this nature, and it seems reasonable to believe that a considerable number of the obscure cases of primary retro-ocular neuritis were really early developments of islands of sclerosis in the optic nerve. As might be anticipated from the other characters of the disease, there is a marked tendency to recurrence in the insular sclerosis group, and to both optic nerves being ultimately affected. Recurrences were noted in 15 cases, and there was retro-ocular neuritis on both sides, though often with a long interval, in 25 cases. Had many of them been observed during a longer time, doubtless the proportion of both these would have been much increased.

In regard to *sex*, and *age*, there are considerably more women than men in the primary sub-class, and this disparity is particularly striking if we take the decade between 20 and 30 years of age. In this period alone we have 77 cases, that is to say more than one-third of the total number of primary cases. Of these 77 cases, 48 are women and 29 are men. This is the period of greatest sexual activity, and the disparity in sex is almost the same whether we regard the sclerosis cases or not. After the age of 40, however, the sexual proportion is reversed; as, out of the 55 cases of primary retro-ocular neuritis occurring after 40, 34 are in men and 21 in women. As apparently accounting for this increased proportion of males, we have the influences of shock, gout, and arterial disease, which appear to have a greater influence then in men than in women.

In conclusion, I must express my indebtedness to Mr. Nettleship, for having allowed me to refer to carefully arranged notes of a large number of his cases bearing upon the questions before us. I have also to thank my colleague Mr. Lawford, for details of several clinical histories; and Mr. Leslie Paton for most carefully taken charts of the visual field in cases of insular sclerosis. By the courtesy of Dr. Farquhar Buzzard, I am enabled to show valuable preparations of an optic nerve from a case of insular sclerosis.

P.S.—The notes of a considerable number of the cases now reviewed were obtained in the volumes of the *Transactions of the Ophthalmological Society*. The majority of the cases are from my home note-books; their histories are usually more complete than those of hospital patients, who frequently cease to attend if, and when, vision decidedly improves. I have included no cases from the National Hospital for the Paralysed and Epileptic, since my statistics would thereby have been invalidated owing to the relatively large number of patients with insular sclerosis.

REVIEWS.

KAMPHERSTEIN (Breslau). **The Pathology and Pathogenesis of Choked Disc.** *Klinische Monatsblätter für Augenheilkunde,* 1904 and 1905.

In this lengthy and methodical paper both the ophthalmologist and the neurologist will find much interesting material relating to the vexed question of the pathology of choked disc. In spite of much clinical and pathological research no one theory has hitherto been brought forward which will fit in with all the known facts, and the author of this paper does not propound any novel hypothesis. As the result of his own pathological and clinical work, which appears to have been done with care, and from a thorough examination of the reports of the researches of other workers in the same field, he concludes that, in the present state of our knowledge, no hard and fast adherence is justified either to the "mechanical" theory advanced by Schmidt-Rimpler, Manz, and others, or to the view that choked disc is the outcome of a descending inflammation, so ably championed by Gowers in this country. This is probably the attitude of most English ophthalmologists at the present time, although the inflammatory theory appears to have the support of a preponderating majority of the facts.

Kampherstein lays great—and, to my mind, undue—stress on the fact that in 60 per cent. of the eyes examined by him, there was œdema of the optic nerve itself. He holds that this œdema descends from the brain through the nerve stem, and acts as a direct cause of the papillary swelling. He describes in detail three varieties of œdema, with drawings of the microscopic appearances, but even from his own tables it seems unjustifiable to regard this œdema as other than secondary, at least in a large majority of the cases.

The first section of the paper deals with choked disc on the pathological side, and the following table summarises the chief findings in fifty-one eyes with choked disc examined by Kampherstein:—

Distension of the inter-sheath space present in 62 per cent.; absent in 37 per cent.

Inflammatory infiltration in the inter-sheath space in 75 per cent.

(In these 38 eyes the space was distended in 23, undistended in 15).

Optic nerve normal in 10 per cent.; œdematous in 60 per cent.; showed inflammatory changes in 56 per cent.

Inflammatory changes in the papilla present in 64 per cent.; absent in 36 per cent.

Lamina cribrosa pushed forward in 78 per cent.

The author thinks that the percentage of eyes in which there was neither œdema of the nerve nor distension of the inter-sheath space is too large to admit of accepting the "mechanical" theory as conclusive, but holds that raised pressure does in some instances act as the direct cause of choked disc. He puts the undoubted occurrence of choked disc in cases of chronic hydrocephalus in this category, and also cites two cases of Uhthoff's, in which swelling of the papilla and blurring of its edges were observed shortly after the occurrence of hæmorrhage into the inter-sheath space. He also adduces the cases, rare, it is true, in which choked disc is reported to have followed an intra-cranial hæmorrhage; but, unless the disc changes were seen soon after the hæmorrhage occurred, and unless concurrent conditions likely in themselves to cause papillitis are excluded, these cases are open to objection. Referring to the "inflammatory" view, Kampherstein found that when meningitis was present the changes in the optic nerves and discs appeared certainly to be those of a descending neuritis. He is herein in agreement with the views of Lawford and Edmunds on this subject. It is to be remarked that in Kampherstein's specimens inflammatory infiltration in the inter-sheath space was found much more frequently than a true "neuritis" in the nerve trunk.

In the clinical part of his paper a careful analysis of two hundred cases of choked disc is given, controlled on the neurological side by such authorities as Westphal, Oppenheim, Thomsen, and Remak. The reader is referred to the original for details and special statistics, but the following are the most interesting points dealt with:—

As regards the *causa causans* of the choked disc, the analysis of the two hundred cases is as follows:—

Brain tumour	134 cases.
Brain syphilis	27 ,,
Tubercular disease	9 ,,
Abscess in brain	7 ,,
Hydrocephalus	3 ,,
Meningitis	2 ,,
Nephritis	3 ,,
Nephritis with lead poisoning	1 case.
Anæmia	2 cases.
Cysticercus	2 ,,
Sinus thrombosis	2 ,,
Malformation of skull	3 ,,
Uncertain diagnosis	4 ,,

Changes in the visual field were found in all but 17 cases, 16 of which were quite recent. Enlargement of the blind spot was present in 72 cases, peripheral changes in 30 cases. In the 200 cases, homonymous hemianopia was present in 5 (4 cerebral tumour and 1 abscess). In one case (chronic hydrocephalus) there was bitemporal hemianopia. In one remarkable case total colour blindness was observed. The patient, a woman aged 39, had had headache and vomiting for 6 months. Papillitis in both eyes was found, most marked in the left eye, R.V. $= {}^5/_8$, L.V. $= {}^5/_{50}$. Right field full, left concentrically contracted. The patient was totally colour blind. Under mercury and iodide of potassium the discs cleared rapidly, and vision of the left eye improved to ${}^5/_6$, but colour vision remained totally absent, "the patient seeing the world like a platinotype photograph." At the end of 4 months' treatment colour vision was completely restored, though some contraction of the field persisted. In two cases papillitis was observed to subside and then to recur. One was a case of syphilis and the other was a cerebral abscess. Both cases are to be recorded in detail by Uhthoff.

With regard to the pupil reaction in cases of choked disc, it was normal in a large majority; a normal reaction was observed in five cases in spite of complete loss of vision, two of which showed a high degree of optic atrophy; and the author mentions another case of post-papillitic atrophy, in which, after eight years of blindness, both pupils reacted briskly to light.

Coming to the question of the frequency of papillitis in cases of cerebral tumour, Kampherstein's figures agree with the statement of Gowers that papillitis occurs in four-fifths of the cases. The statistics of numerous other observers agree with this, and Kampherstein confirms the statement of Lawford and Edmunds as to the higher percentage of papillitis in tumours of the base and of the cerebellum.

Of the nine cases of tubercular disease, eight were solitary tubercle and one was tubercular meningitis. One of the tubercular cases presented a typical albuminuric retinitis picture, and this was the only instance of the kind in the 200 cases. In one child, with a tubercular mass in the brain and tubercular meningitis, the very exceptional occurrence was observed of minute tubercles in the iris.

With regard to the frequency of disc changes in tubercular meningitis, Uhthoff in 19 cases saw neuritis in four, and normal fundi in 15. With careful watching from day to day Gowers holds that changes are found in one-half of all cases.

In all the 7 cases of brain abscess papillitis was present; this is an unusually large proportion, but bears out the statement of MacEwen. From an analysis of 155 cases collected from the literature on this subject, Kampherstein finds that papillitis is present in 25 to 30 per cent. of the cases of cerebral abscess. He mentions the important fact that several instances of unilateral papillitis (always on the same side as the abscess) are on record.

In simple meningitis, papillitis is comparatively rare. The author collected 13 cases of meningitis with papillitis. Of these patients four died and nine recovered. In six of the latter lumbar puncture was performed.

In chronic hydrocephalus, Kampherstein saw three cases with post-papillitic atrophy and one with choked disc. It is noteworthy that well-marked papillitis has been observed several times in cases of chronic hydrocephalus (see Kupferberg, *Zeits. f. Nervenheilkunde*, 1 and 2, 1893. Wilbrand and Binswanger (*Zentralblatt f. med. Wissensch.*, 1879, p. 923). In Kupferberg's and in Kampherstein's cases, at any rate, there was absolutely no appearance of inflammatory changes.

Uncomplicated choked disc is of rare occurrence in kidney disease, unless the renal mischief is due to lead poisoning, in which condition Uhthoff found it in 8 per cent. Typical choked disc was observed in three cases of kidney disease, one of these being an acute parenchymatous nephritis, from which the patient recovered. The occasional association of papillitis with anæmia (chlorosis) is well-known, and most ophthalmic surgeons of experience have seen instances. In only two (*i.e.*, 1 per cent.) of Kampherstein's cases of papillitis was chlorosis the apparent cause. Referring to the so-called "pseudo-neuritis" seen in some cases of hypermetropia, Nottbeck found this appearance in 20 to 24 out of 10,000 persons.

In three of Kampherstein's cases the papillitis was due to malformation of the skull (Thurmschädel). In 42 cases of this malformation collected by Graefe and Marz, 36 showed post-papillitic atrophy. In two there was bilateral choked disc, and in two there was choked disc in one eye and secondary atrophy in the other. In the cases which have been examined *post-mortem* great constriction of the optic foramen has been found, and these cases are apparently instances of the production of papillitis by pressure.

Many observers in this country have doubtless met with a group of cases presenting the symptom complex of cerebral tumour, but from which the patients recover, though with permanent and often complete atrophy. Kampherstein refers readers to Nonne's paper *(Deutsch. Zeitsch. f. Nervenheilk.*, 1904, Bd. xxvii.), wherein a large number of such cases are collected, along with remarkable cases of another group, in which the patients die with all the symptoms of cerebral tumour, including choked disc, but in which pathological examination fails to reveal any changes either in the brain or the meninges.

Kampherstein holds that the occurrence of papillitis after intra-cranial hæmorrhage is an important fact against the "inflammatory theory"—as doubtless it is where the hæmorrhage has been traumatic.

The clinical part of the paper concludes with references to some of the rarer causes of choked disc, such as leukæmia, fracture of skull, and multiple sclerosis. For the details of these, as well as for valuable tables relating to the pupil reflex in mental diseases, the reader is referred to the original.

The last section of the paper is devoted to the experimental production of choked disc by injection of fluid under the dura. After referring to the well-known experiments of Schwalbe, Schmidt, and Manz, Kampherstein gives the results obtained more recently by Schulten *(Arch. f. klin. Chirurgie*, xxxii.), and Merz (*Arch. f. Augenheilk.*, 1900, xli., S. 325). Kampherstein details his own and Dr. Heine's experiments on dogs, the results of which were verified by Uhthoff. During life only the very slightest changes were observed in the papilla; but when the pressure was still further raised after the death of the animal, well-marked choked disc was produced. In every case the inter-sheath space was found distended, while not the slightest alteration could be observed in the optic nerves themselves. Kampherstein rightly attaches relatively little importance to their results in relation to the causation of choked disc in man.

W. W. Sinclair.

A. Pihl (Gothenburg). **Retro-bulbar Neuritis along with Recurrent Pus-formation in the Antrum.** *Klinische Monatsblätter für Augenheilkunde*, July, 1905.

The case described and commented upon by Pihl, stripped of unnecessary details, may thus be briefly described. It was that of a man of 42, foreman in a rope-work, who first consulted him in February, 1901, on account of gradual failure of vision of the left eye, for which he could give no explanation, and which had existed for about a year. On examination, the only thing which could be made out not to be as it should was that he suffered from ill-smelling discharge from the nose, and often from headache and toothache. In other respects the man was in sound health, his urine contained neither sugar nor albumin, and he was not unduly addicted either to alcohol or tobacco. The right eye had normal vision, the left only $^1/_{10}$ and J. 13. Pupil reactions were normal, and there was no hemianopia. There was a distinct central scotoma for colours, however; the fundus was quite normal, unless for a very slight and very doubtful hyperæmia of the disc. The case, then, was undoubtedly one of retro-bulbar neuritis, but the etiology was not obvious. A rhinologist who kindly examined him reported the presence of pus coming from the ethmoidal and maxillary sinuses on the left side. This condition was thoroughly treated, the antrum freely opened into, drained, and stuffed with iodoform gauze. Vision immediately began to improve; in May it was 0·6 and in December nearly 0·9. But in the following February (1902) he returned with vision only 0·2, and with pus again in the antrum. On re-opening of the old drainage wound and free washing out the pus ceased to come, and vision rose again to normal by July. He had another relapse, however, and in January, 1903, returned to the same rhinologist, with his vision again very bad. There was no exact record of it taken, but he certainly was unable to read. Again a collection of pus was thoroughly cleared out, and again vision returned. Since that occasion he has kept well, and was seen in July, 1904, with full vision in each eye.

Such a history affords an unusually clear instance of the intimacy of the relation between nose and eye, a fact which, though noted, we are told, so early as the second century, has hardly received due recognition save in the last twenty years or so. In the particular case with which we are dealing there can be little doubt that the inflammation was conveyed from the affected mucous membrane through the orbital wall to the tissues in the orbit, and in particular to the optic nerve. The author considers that in all probability many of the cases of neuritis from "cold" have their origin in the same source. There is ground also for believing that infection may take place from the mucous membrane of the throat and mouth; this occurred, for example, in the case of a girl of 14, who after exposure to a severe cold suffered from sore throat, hypertrophic rhinitis, double vision, and symptoms of a retro-bulbar neuritis; she recovered completely when operation had cured the stenosis of the nasal passages. In addition, one must not forget that infection may readily be spread by way of the nerve fibres and the vascular twigs, and the same is true also of the lymph vessels. In regard to the vessels, Ziem asserts that phlebitis of the orbit and even of the cavernous sinus is not so very uncommon after furuncle of the nasal passages. In obstruction of the nose, too, indications of interference with the orbital circulation are quite frequent, such as œdema of the lids, and chronic hyperæmia of the conjunctiva and circumcorneal vessels. The occurrence of hæmorrhages in the conjunctiva and in the interior of the eye during coughing or sneezing perhaps points in the same direction. In addition, as regards the nerve path, the frequent manifestation of reflex photophobia, reduction of central vision, restriction of the field, etc., suggests that these may have their origin in disturbances in the areas supplied by other branches of the same fifth nerve.

When these matters are duly considered it becomes the more astonishing that the obvious external means of communication between nose (and so throat, etc.), and conjunctival sac, namely the lachrymal canal, appears so very seldom to be the cause of any such complication of symptoms either from nose to eye or from eye to nose. It is probable that one explanation for this may lie in the greater resisting power of the nasal mucous membrane, a power so necessary to a membrane which is constantly exposed to atmospheric conditions and influences. On the nasal mucous membranes organisms do not find a concondition of affairs suited for their growth. Else how could one account for the facts (among others) that trachoma and gonorrhœal ophthalmia are (practically) never conveyed to the nose. On the other hand, the pavement epithelium of the conjunctiva and of the upper lachrymal passages must offer a strong resistance to infection from germs at all. This is plain when we reflect how very few of the septic, tubercular and other pathological conditions of the cornea effect a lodging place in the sac. No doubt the mechanical influence of the current through the passages helps materially to maintain this immunity.

W. G. S.

C. Palermo (Messina). **Toxic Retro-bulbar Neuritis.** *Annali di Ottalmologia*, xxxiv., 5—6.

The first forty pages of this thesis are taken up by a review of the literature of the subject since the year 1870—given in chronological order—in which all the known substances which have produced retro-bulbar neuritis are discussed, and the various opinions of the different authors given as to the pathological changes found clinically, experimentally, and microscopically. The pathological conditions underlying this affection have not yet been definitely settled, and very contradictory views are held by various authorities as the result of their experiments and researches. The essential lesion, as has been recognised by everyone since Samelsohn's masterly work, lies in the papillo-macular bundle, but as to the question of how the various toxins affect this tract, the most diverse views have been and are still held. In fact, all the structures composing the optic nerve—the connective tissue, the nerve fibres, and the blood-vessels—have each been credited with primarily starting this condition under the stimulus of a toxin.

Samelsohn and Uhthoff consider retro-bulbar neuritis as a primary interstitial neuritis of the papillo-macular bundle, while Nuel, on the contrary, looks upon it as a primary parenchymatous neuritis.

Birch-Hirschfeld, experimenting with methyl alcohol on dogs and using Nissl's method of staining, found degenerative changes first appearing in the ganglion cells of the retina, not specially limited, however, to the papillo-macular region, following upon which there was a nerve fibre degeneration. Finally there is Schiek's view of an arterio-sclerosis diminishing the blood supply to the papillo-macular bundle.

With these conflicting views before him, the author conducted a series of experiments with santonin, aniline oil, iodoform, and filix mas, in the hope of finding some pathological changes with which to support some, or one, of these various opinions. Santonin in large doses is well known occasionally to produce "yellow" vision, and several cases have been published in which toxic amblyopia has followed its administration. The experiments on rabbits were absolutely negative in every way, although they were receiving as much as 5 grams per day. Aniline oil and iodoform produced during life no appreciable visual disturbances, while identical pathological changes were found in the optic nerves.

In both series of experiments there was a nuclear increase in the connective tissue stroma of the nerve trunk, but the nerve fibres appeared perfectly normal, even under special staining reagents.

The most definite results were obtained by filix mas on dogs which, while showing general symptoms of poisoning, never, save with one exception, manifested any ocular symptoms. In this dog blindness supervened in the right eye only after a month, when the administration of filix mas was discontinued and the animal killed two months after. The pathological changes observed bore no very definite relation to the quantity of the poison administered, it is true; still in the various sections of the different nerves examined a complete record could be made up of the changes following poisoning with filix mas. The optic nerve showed alteration in the nerve fibres consisting of, first, vacuolation and then later complete degeneration of the nerve parenchyma, accompanied by a hyperplasia of the interstitial tissue, and finally increase of the glia.

The author, therefore, agrees with Nuel that in retro-bulbar neuritis the primary pathological condition is a parenchymatous neuritis.

THOMSON HENDERSON.

EDWARD JACKSON (Denver) and GEORGE E. DE SCHWEINITZ (Philadelphia). *The Ophthalmic Year-Book for 1905*, pp. 319. The Herrick Book and Stationery Co., Denver, Colorado.

IN their preface to this, the second volume of the *Ophthalmic Year-Book*, the authors refer to the appreciation of the first volume shown by those best fitted to judge of the need for such a publication. We have no doubt, after perusal of the volume now before us, that in its turn it will meet with an equal or perhaps larger measure of approval.

The compilers of this annual deserve the gratitude of at least all English-speaking ophthalmologists for their production of a really valuable record of ophthalmic literature. The arrangement of subjects seems to us good and practical. Short but explicit reviews are given of all the most important contributions to literature. In addition, there are two alphabetical lists: one of the authors of books and monographs, giving the titles and places of publication of the treatises; another (also under authors' names) of the titles of articles which have appeared in journals. A carefully-compiled index completes the volume. The letter-press is not quite free from mistakes, and in places the composition is open to criticism.

A little inconsistency is shown in quoting the names of authors; in the same page one writer will be referred to as "Dr." or "Mr." A. B., while another, equally distinguished, is shorn of his title, and appears as plain X. Y. It is better to have one plan, and for our part we prefer the omission of the title.

It seems to us unfortunate that when starting this Year-Book the authors decided not to call the volume by the year with which it deals, *e.g.*, the volume before us is entitled *The*

Year-Book for 1905, but it deals solely with the literature of 1904. This plan will, we think, lead to some confusion in orders given to booksellers or librarians, but it is now too late to make a change, and we do not doubt that the question was carefully considered by the authors. We earnestly hope that the compilers of the Year-Book may be able and willing to continue their well-chosen work, and we look forward with pleasure to future volumes.

WESSELY (Berlin). **The Pressure-bandage in Detachment of the Retina.** *Klinische Monatsblätter für Augenheilkunde*, May, 1905.

THE treatment of detachment of the retina by the pressure-bandage, introduced about 30 years ago, has fallen more and more into disuse. The recently-expressed opinion of Sattler, who says that in his experience the immediate improvement which is often observed from its use is never maintained, and that on the whole he thinks it rather harmful than beneficial, may be taken as fairly representing the general view on the subject. If the methods of treatment which have supplanted it had proved wholly satisfactory, the pressure-bandage might well be allowed to fall into oblivion; but, unfortunately, this can hardly be said to be the case. It seems, therefore, worth while to call attention to a case in which its employment was of definite and lasting utility.

The case was that of a woman of 42, who had suddenly discovered, on getting up in the morning, two days before examination, that she could hardly see with the right eye, and as Wessely found that she had an extensive detachment of retina, involving all but the inner quadrant, he decided to employ the pressure-bandage as affording the most rapid means of getting the macular region into contact with the choroid again. The patient was accordingly kept strictly in bed, with a very firm bandage, daily renewed, on the right eye, while purgatives and daily sweating with salicylate of soda were employed as auxiliary measures. In three days' time the detachment had entirely disappeared, and the patient could read ordinary print. The eye at the same time was considerably injected, its cornea showed slight linear opacities from folding, there was some entropion of the lower lid, and the tension of the globe was decidely minus.

The bandage was now left off, but the other treatment continued as before, except that the sweating was omitted every other day.

Four days later, after straining, the patient noticed a diminution of vision, and on examination the detachment was found to have returned, though it was not so prominent as before. The bandage was now re-applied, but, in the temporary absence of Wessely himself, much less firmly than before, and at the end of 10 days Wessely found the retina still extensively detached. He applied the bandage very firmly, and in five days' time the retina was again completely replaced. Once more it was omitted, and four days later examination showed a slight peripheral detachment. Firm bandaging was resumed for another four days, when all detachment had disappeared. A light occlusive bandage was worn for another week, and after that the patient was allowed to return by degrees to her ordinary course of life. No relapse occurred, and when she was seen six months later it was found that the retina which had been detached was in no way distinguishable from that which remained undetached, and the visual functions were equal to those of the other eye. There existed myopia of 11D, with a large staphyloma posticum and some vitreous opacities, in each eye. No other cause for the detachment was apparent.

Wessely is far from suggesting that the pressure-bandage will produce an equally satisfactory result in all cases of detachment of retina; he is even prepared to admit that it may do harm in some. But in regard to this point he has made some experiments on animals, applying direct pressure to the sclerotic by means of a pair of flat hooks passed into the orbit until the bulk of the vitreous was so reduced that the eye was quite soft and did not regain its normal tension for four or five days after the pressure was removed; in none of these experiments was any detachment of the retina to be seen at any stage; and if a detachment was artificially produced (as by the application of a jet of steam to the sclerotic) it recovered no less quickly in such eyes than in others which had not been subjected to squeezing.

The case recorded above, with its three repeated sequences of the application of pressure and disappearance of the detachment, has almost the definiteness of a physiological experiment.

W. G. L.

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CASE OF CONGENITAL WORD-BLINDNESS. (INABILITY TO LEARN TO READ.)

By J. Herbert Fisher.

In the *Ophthalmic Review*, vol. xx., p. 61, Nettleship published five cases of congenital word-blindness allied to those described first by Hinshelwood in the *Lancet* of May 26th, 1900. Though the characteristic features of these cases of "inability to learn to read" must now be well known to ophthalmic surgeons, the list of examples does not expand very rapidly. Hinshelwood has published five cases in all, the last being reported at the annual meeting of the British Medical Association in 1904. For the recognition of these cases we are to a large extent dependent on the observation of parents and the answers which they give to our questions; this being so it is probable that a proportion of the cases which occur in hospital practice go unrecognised and are treated by clinical assistants as refraction cases. Hinshelwood's keen observation for the defect has enabled him to detect four examples in hospital practice. The following case seems to agree with those already reported, and as there are one or two points about it which are interesting and suggestive, I think it should not go unrecorded.

Miss F., æt. 6, was brought to me privately in October, 1904, owing to the extreme difficulty which she experienced in learning to read: she "mixed the letters up." It did not appear that she had any defect in vision for ordinary purposes: each eye had full visual acuteness, with a hypermetropia in the right of 0·75 D., in the left of 1·25 D.; the right iris showed an inner sector, about $^2/_5$ths of its whole area, which was more deeply pigmented than the remainder; the eyes in every other respect were normal. She had been trying to learn to read for two years; had attended school for one term, but had since been taught privately by a governess. I found that when trying to read she had to spell words of two or three letters, and in doing so often misnamed the letters; when spelling words she might name the first letters correctly, but the succeeding ones quite inaccurately; when I tested her with short words she constantly made mistakes, such as calling "was" "of." I was told that her younger sister who had been learning to read for only one month could already read as well as my patient—she was however being taught on a different method, described as the "look and read" principle. Miss F. was not good at arithmetic; she experienced unusual difficulty in adding figures,; sums were a trial to her and she was bad at arithmetical tables; she was also said to start reading music correctly, but soon began to misname the notes. In all other respects, she was a bright intelligent child, and quite sharp, had a good memory for facts, and learned and repeated poetry readily.

A point of special interest about this case was that her mother's brother was ten years of age before he succeeded in learning to read; all his letters were mixed up, and even now in adult life he is said to spell abominably. I think we may fairly take this as evidence of a family tendency to imperfection in development of the visual memory centre for words in the cortex of the left angular gyrus. I do not think any evidence in this direction has been elicited before, but such hereditary tendency seems not improbable.

In the case of my patient there appears to be reason to believe that a congenital defect exists in the centres for the visual memory of figures and musical notes as well as in that for words and letters. The association affords support to the view Hinshelwood has advanced that the allied visual memory centres are in all probability located in adjoining areas of the cerebral cortex, and emphasises his objection to Wernicke's statement that in the diagnosis of these cases great importance may be attached to the fact that these children have, as a rule, no difficulty in recognising and dealing with figures. In my case a wise step had already been taken when the child was withdrawn from school and placed under private tuition; much patience is necessary in the teaching of these children, who are detrimentally embarrassed by their mistakes when being taught in class. Miss F.'s younger sister was, as far as is known, in no way defective, but was being taught to read on the "look and read" principle; this I understand to mean that the recognition of individual letters and the spelling of them into words is no part of the method; the child is taught to study and recognise printed words as a whole; the unit for observation and visual memory is the word and not the letter; both Hinshelwood and Nettleship insist on the necessity of steady perseverance in the development of the defective visual memory centre or the training of a vicarious one probably in the angular gyrus of the right hemisphere, and advocate beginning on the old plan of teaching individual letters. I think it is worth considering whether the "look and read" system is not the one to be adopted for cases of congenital word-blindness; it is after all by the visual memory of words rather than by that of their constituent letters that we are enabled to read accurately and fluently. In cases of "inability to learn to read" it is obviously desirable that the shortest route to reading should be taken. The study of words as a whole would probably be as efficient a training for the development of the defective centre as the study of individual letters, and if this study of words can be carried out *ab initio* much saving of valuable time may possibly be effected. As scientific men we need in these times to recognise that in every case where as good mental training can be provided by profitable as by profitless study, the former is the course we should recommend. If the "look and read" system of instruction is available, and were made use of for a case of congenital word-blindness, I presume oral tuition in spelling would be required, and in writing the patient would probably make many mistakes in spelling. If he had received good oral instruction in spelling it is conceivable that the use of a type-writing machine might help to save him from such blunders later in life.

Miss F. paid me a second visit on August 8th, 1905. Her mother informed me that she had got on quite well on the "look and read" principle, and now cannot be kept from reading. She was getting on better with figures and the music lessons were progressing favourably; they were at a standstill before. She was able to read two-syllable words to me well; having learnt the alphabet before she is not a pure example of the "look and read" method; studying the word "remain" she got the first syllable correct; then not familiar with "main" she next scrutinised "ain"; unable to identify this combination of letters she next tried "in" which she correctly recognised, but with the result that she vocalised the word incorrectly in the end.

REVIEWS.

Stülp (Mülheim). **Amaurosis from Filix Mas.** *Archives of Ophthalmology*, xxxiv., 3, 1905.

In the case which forms the text for this article, Stülp had the very rare good fortune to be in a position to examine ophthalmoscopically the eyes of a man immediately after the onset of acute toxic symptoms. The principal facts are that a man of 34, of medium physique, was, on account of anchylostomiasis, given on one evening 0·3 gm. of calomel, and at eight next morning 4 gm. of an ethereal extract of filix mas. As there was no result, the patient received next morning at the same hour a double dose of the same extract. He did not appear to suffer any immediate inconvenience, was out of doors for a time in the afternoon, returned at 7 p.m., apparently quite well, but retired to bed at once. After that point his memory became a complete blank, but it is the case that he sat up in bed and ate his supper; the attendant who brought it to him noticed, however, that he seemed stupid, and gave the impression of not seeing well. During the night he became very restless, and at 3 a.m. was found groping about the room in a very excited state and evidently quite blind. After being got back to bed he became comatose, in which condition he remained in spite of all treatment until the next night or even the following morning, and during all this time he passed neither urine nor fæces. The first urine thereafter contained neither sugar nor albumin.

The patient was examined by Stülp about noon of the day of coma, when the pupils were found dilated almost to maximum, and fixed; the eyes must have presented a very peculiar appearance, for even in daylight a whitish reflex, somewhat resembling that seen in glioma, was visible through the pupils. With the ophthalmoscope the whole fundus was seen to be covered with a copious, snow-white œdema, so that neither macula nor disc could be seen; the vessels appeared here and there in the white mass, the arteries being thread-like, with the column of blood broken into little portions, while the veins were tortuous, and filled with broad and very dark columns of blood. Though the œdema generally went down, and though nitrite of amyl and other remedies were given, no vision was ever regained by the patient. A month later the disc in each eye was white and the fundus flecked with white; the fovea was a triangular grayish-red spot. Here and there only could arteries be seen,—yellowish and cord-like, the veins were small and sheathed in white. There were several large hæmorrhages near the macula and many smaller ones towards the periphery.

This observation is certainly rare, if not unique, in respect of the early examination after the ingestion of the toxic substance and the onset of symptoms; in the majority of those cases previously recorded the patient has been subjected to a thorough examination only after a delay of weeks or months. It is quite true that in a few cases animals have been poisoned with male fern and the eyes examined subsequently, but even in these instances the details are not complete, and are insufficient to indicate which part of the visual apparatus is that primarily acted on by the drug. Nuel considered that the changes which he observed in the ganglion cells of the retina—viz., softening, along with proliferation of the neuroglia and perivascular œdema—were primary, and that the vascular changes (endo-vasculitis and peri-vasculitis) were secondary. Masius and Mahaim, on the contrary, were of opinion that the essential changes were the vascular, and that to them was due the blindness. Okamoto experimented upon dogs, and found in the optic nerve swelling of the medullary sheath, atrophy of the axis cylinders, and overgrowth of connective tissue, but his results are vitiated by the long interval allowed to elapse before the examination was made, and the tissue alterations which he found are probably not primary at all, but consecutive.

How is it that the drug produces its action? Sidler-Huguenin suggests that by its action upon the sympathetic a spasm of retinal arteries is produced, and perhaps also changes in the walls of the arteries supplying other peripheral parts of the visual mechanism, while Uhthoff is inclined to the view that it is upon the nerve elements of optic nerve and retina that the first and primary action is, and that interference with the circulation and vascular system only follows.

There are on record, says Stülp, three other cases besides that under present consideration in which what might be called an early ophthalmoscopic examination was made. In the first, fourteen hours after ingestion, Haberkamp observed the papillæ to be grayish-red, and noted that there was venous stasis; in another, in which the interval was thirty-six hours, there was also marked stasis and cloudiness of the disc; in the third, in which the interval was of similar extent, very similar changes were found by Nieden. In all four then, venous stasis and a copious œdema of retina were observable, a picture closely resembling that seen in embolism of the central retinal artery, in thrombosis of the vessels, in acute loss of blood, in persistent spasm of the retinal vessels, and in *commotio retinæ*. The cause, one would thus conclude from analogy, is an œdema of the retina dependent upon sudden alterations in the vascular supply to that membrane.

A singular argument, though it must be admitted not a powerful one, which speaks in favour of the action of the drug in causing blindness being vascular rather than directly upon the nerve tissue is supplied by its influence in anchylostomiasis. If it be given in capsules which dissolve only in the intestine, its action as a vermifuge is but slight, while if given so that it is absorbed into the circulation and thence imbibed by the parasite as it drinks from the intestinal wall, its action is much more powerful. The toxic influence is therefore not direct upon the worm, but through the blood of the host. It has further been shown by Straub and other investigators in toxicology that filix and its derivatives may actually kill the muscle cells without interrupting the nerve condition; it is not of course maintained that it has no action upon nerve tissue,—only that it acts powerfully upon other structures and functions.

Stülp's idea then is that the poison absorbed into the blood enters the central retinal artery where (and in its finer ramifications also) it irritates the fine muscular tissue of the vessel walls and causes a spasmodic contraction. It takes but little of this effect to destroy permanently the activity of the ganglion cells; they have very feeble resisting power, but if the spasm is transitory they may recover, as one observes in commotio retinæ for example. If therefore the dose be at all high there follows paralysis of the muscular coat, vascular stasis and deeper paralysis of the ganglion cells and their prolongations. Any general toxic influence with its consequent injurious action on the circulation and blood supply will increase the evil and, rendering it more permanent, lead to atrophy of the nerve, as has been seen in the later stages of such cases. Possibly also the anæmia caused by the presence and habits of the parasite may have further conduced to this evil result in some of the patients.

In this connection, too, it should be pointed out that it is not constantly a bilateral amaurosis which takes place; in forty-seven cases of poisoning in which visual symptoms were present, these are noted as having been bilateral in nineteen and unilateral in fifteen.

In conclusion, Stülp makes the very important suggestion that diligent efforts should be made to discover an antidote to anchylostomiasis and a destroyer of the worm more certain to accomplish the desired result, and not so terribly injurious in the cases in which an overdose is absorbed as is the case with filix mas.

W. G. S.

BIRCH-HIRSCHFELD, HOSCH and ELSCHNIG. *v. Graefe's Archiv für Ophthalmologie*, 61, 1.

PROF. LANGE recently published a paper in which he advanced the view that the cause of high myopia lies in the congenital defect of elastic fibres in the sclerotic; this he based on the microscopical examination of four myopic eyes where he found only mere traces, if not an entire absence, of these fibres. Such a theory seemed feasible enough, considering the extreme thinning which the sclerotic exhibits, particularly in the region of the true posterior staphylonia, in advanced cases of progressive myopia. The anatomical basis of this theory has been the subject of investigation by Birch-Hirschfeld, Hosch and Elschnig, who unanimously refute it. Birch-Hirschfeld examined six eyes, whose myopia varied from 6 to 30D, using the same stains as Lange employed, but in none of them did he find any striking diminution of the elastic fibres, while in their form and arrangement they were similar to those found in emmetropic eyes. Birch-Hirschfeld has kindly sent to the reviewer slides of two cases (– 10D and – 30D), who thus, from his own examination, can substantiate the author's observations. Hosch examined seven eyes, and found no diminution in these fibres. Elschnig examined more than a score of myopic eyes of all degrees, with a similar result. All three writers refer to the capricious way in which the elastic fibres of the sclerotic stain, and note that error may in this way creep in through the technique. Birch-Hirschfeld points out that the celloidin in the sections readily takes up the stain, and may thus obscure the elastic fibres; and Elschnig, who gives a detailed account of the behaviour of the connective-tissue, and elastic fibres in the various layers of the sclerotic, emphasises the possibility of missing the elastic fibres in myopic eyes. Such overwhelming evidence against Lange's theory will no doubt induce him to institute such further investigation as will tend to corroborate or modify his first results.

THOS. SNOWBALL.

H. FRENKEL. **Traumatic Myopia.** *Annales d'Oculistique*, July, 1905.

THAT certain cases of myopia have a traumatic origin is a fact that has been known for more than thirty-five years; yet they have been looked on more as curiosities than as common occurrences. Now, however, ophthalmic surgeons are giving these cases greater attention because of the prominence which has been imparted to all accidents occurring to persons during their work, under the various Working Men's Compensation Acts.

As regards the frequency of traumatic myopia, Frenkel gives a tabulated list of forty-three cases which he has found in the literature of the subject. This list, he admits, is not an exhaustive one, but nevertheless he is driven to the conclusion that we are badly off for data on which we can compute the frequency of these cases. He divides traumatic myopia into four classes, viz.:—

1. Myopia from spasm of accommodation.
2. Myopia from relaxation of the zonula.
3. Myopia from subluxation or luxation of the lens.
4. Myopia from lengthening of the axis of the globe.

As far as regards the first two forms, it would appear at first sight that they were contradictory, but on reflection one can perhaps admit that distension followed by relaxation of the zonula can be accompanied at the same time by a spasm of the ciliary muscle—a spasm which can survive the trauma as well as in the cases where there is no relaxation of the zonula.

When these cases of traumatic myopia were first published it was thought that some light might be thrown on the question of accommodation by them, and Schöler (1875) thought that they confirmed the theory of Helmholtz. But in 1898 Bouchart came to the conclusion that traumatic myopia without rupture of the zonula was explained equally well by the theory of Helmholtz as by that of Tschnerning provided that we admit a spasm of accommodation. On the other hand, he was of opinion that traumatic myopia with rupture of zonula is more favourable to the theory of Helmholtz, and is badly explained by the theory of Tschnerning. In those cases in which the aqueous humour is driven back into the posterior chamber, where it presses on the anterior equatorial surface of the lens, which consequently in its middle part takes the form of a lenticone, the theory of Tschnerning may be admitted.

In differentiating traumatic myopia into the above four classes one must always bear in mind that the various groups may pass from one variety to another according to the intensity of the trauma and the resistance of the eye tissues.

In spasmodic myopia the punctum remotum approaches the punctum proximum, leaving still some dioptres of amplitude of accommodation. The degree of the myopia appears to be in proportion to the diminution of the amplitude of accommodation, and consequently to the age. This myopia may disappear spontaneously, but it is cured certainly by the use of atropia. Some neuropathic predisposition may exist, but does not in all cases. Myosis is sometimes present. Myopia from relaxation of the zonula is distinguished from the preceding by the fact that atropia is without effect, and that eserin may help certain cases. It is most frequently accompanied by mydriasis or irregularities of the pupil, or by diminution or abolition of pupillary reflexes, by paresis or paralysis of accommodation. The prognosis is graver, but cure may take place spontaneously or by appropriate treatment. Healing may occur soon or late, or in other cases there may be a raised tension or even glaucoma.

In myopia from subluxation or luxation of the lens, there may be other lesions of the eye (hyphæma, irido-donesis, detachments of the iris, rupture of the chorioid). The danger of glaucoma is greater, and spontaneous cure is almost impossible.

Myopia from lengthening of the axis of the globe is probably due to inflammatory trouble in the posterior segment of the eye caused by the trauma. It may appear soon or late and resemble a malignant myopia. Prognosis in cases of traumatic myopia is best in spasmodic myopia, and is very grave in cases due to luxation of the lens because of the glaucomatous symptoms which arises. Frenkel gives a full bibliography.

Frank C. Crawley.

Golesceano. **Ocular Atmotherapy.** *Recueil d'Ophtalmologie*, July and August, 1905.

The therapeutical value of heat in the treatment of inflammatory diseases of the eye has been pretty generally recognised since the days of Hippocrates. The means of applying heat to the eye have been numerous and varied, but none of the methods can be regarded as having been entirely satisfactory so far. Such means as poultices, fomentations, eye baths, hot water and vapour douches, applied indirectly to the eye through the closed lids, are unsatisfactory because the initial temperature is maintained only for a very short time, and the applications have consequently to be frequently renewed. Further heat applied in this indirect way is, according to the author, much slower in bringing about the resolution of inflammatory products than if it had been applied directly to the uncovered eye.

To obviate these inconveniences and to obtain a constant degree of heat which can readily be applied and regulated by the patient himself, are the objects aimed at by Golesceano. His apparatus consists essentially of a small dome-shaped copper boiler, which holds about 200 grammes of water, and which is provided with an opening at the top through which the water can be put in, and a short metal tube a little distance down the dome. This short tube is connected, by means of a rubber tube, to a double-channelled tube which is the most important part of the apparatus. The peripheral part of this tube transmits vapour from the boiler, whilst the central part transmits cold air, which is forced in by means of a rubber hand bellows through a branch tube. The double-channelled tube is attached to another rubber tube which connects it with a funnel-shaped mask (for ocular atmotherapy) or with a Y-shaped glass tube (for nasal atmotherapy). The funnel-shaped eye mask may be applied so that it fits round the orbital margins, or it may be used at a distance of 4 centimetres from the eye. In the former case the tube from the boiler and pump is fixed to the stem of the funnel, whilst in the latter case the rubber tube is fixed to a tube which enters through the side of the funnel. When the water in the boiler is boiling the hand pump is worked and the cold air which is forced through the central part of the double-channelled tube drives on the hot vapour in the peripheral part, and at the same time cools it to the requisite temperature. The more vigorously the pump is worked the higher will be the temperature of the vapour which enters the funnel; a temperature of 40° to 45° C. is generally used, though it may be tolerated as high as 50° C. The application of hot vapour to the eye is followed by injection of the conjunctival vessels and some lachrymation accompanied by a whitish frothy secretion. The cornea is not affected in any way, and retains its normal brilliancy. The deeper parts of the eye are not affected. The sittings last from five to ten minutes each, and their number is generally limited to three or four a day.

The author has found this form of treatment of considerable value in blepharitis, kerato-conjunctivitis, phlyctenular keratitis, marginal or central infiltration of the cornea, interstitial keratitis, corneal abscess with iritis, herpes febrilis corneæ and scleritis. The photophobia with spasm of the orbicularis and angular rhagades, so often seen with many of these diseases, especially in children, disappears after a few application of atmotherapy. In purulent infiltration of the cornea the hot vapour has a detersive action. In herpes corneæ and iritis atmotherapy has an analgesic action. The increased vascularity and phagocytosis produced by this treatment shortens the duration of interstitial keratitis. The usual treatment for the diseases mentioned are employed in conjunction with the treatment by hot vapour.

Nasal Atmotherapy. In many cases the ocular condition is dependent upon or assocaited with a lesion of the nasal mucous membrane. In such cases the nose requires treatment as well as the eye. For nasal atmotherapy the funnel-shaped eye mask is replaced by a somewhat Y-shaped tube. One branch of the Y is connected to the tube leading to the boiler and hand pump, the other is covered with a rubber cap, whilst the stem is covered with a short piece of rubber tubing and is the part introduced into the anterior nares. For intra-nasal use half a teaspoonful of the following solution is added to the water in the boiler:—

Menthol	2 grammes.
Guaiacol	5 ,,
Camphorated alcohol	80 ,,

The projection of hot vapour over the nasal mucous membrane produces abundant lachrymation, conjunctival hyperæmia, a whitish conjunctival secretion and a much increased secretion from the nasal glands. These symptoms quickly pass off when the application is discontinued. Occasionally it may be followed by sneezing and a temporary feeling of cold in the head. If the nasal tube does not fit closely the vapour may escape around it and scald the margins of the anterior nares. A little vaseline should be applied to edges of the alæ to prevent this. The author finds that the intra-nasal hot vapour spray has a decided inhibitory action on the growth of microbes in the nose when its mucous membrane is diseased.

The cases in which the combined ocular and nasal atmotherapy has been found of value include unilateral lachrymation with hypertrophic rhinitis on the same side, unilateral lachrymation with atrophic rhinitis without ozœna, unilateral seromucous dacryo-cystitis without distension of the sac with chronic rhinitis, lachrymation with strumous rhinitis, bilateral lachrymation with atrophic rhinitis. A case of recurrent infection of the wound after excision of the lachrymal sac for purulent dacryo-cystitis recovered immediately when treated by intra-nasal camphorated mentho-guaiacol sprays. The nasal atmotherapy should be continued as long as the ocular lesion persists.

J. Jameson Evans.

S. Santucci (Turin). **Endothelioma of the Optic Nerve.** *Annali di Ottalmologia*, xxxiv., 7—8.

Primary tumours of the optic nerve are rare, hence the interest of this case, not only on account of the histological structure of the growth, but also because of the eminently successful and satisfactory results obtained by its removal by Krönlein's operation—an article on which operation appeared in a recent number of this Review.

As in most of the reported cases of primary tumour of the optic nerve, the patient was a child six years of age. The parents had noticed for some time previously that the right eye was squinting, and on examination the eye was found to be blind. There was slight proptosis, the globe being pushed somewhat outwards; there had never been any pain. The fundus showed some papillitis. Three months later, as the exophthalmos had increased and the choked disc became more marked, it was decided to remove the retro-bulbar tumour. This was done after Krönlein's method, when it was discovered that the growth occupied the whole of the orbital part of the optic nerve, of which it was, in fact, a primary tumour. The tumour having been isolated, the nerve was resected first close to the globe and again a few millimetres from its entrance in front of the optic foramen. The eye was then replaced *in situ*, and the orbital fascia, bone and periostium replaced. Healing followed by first intention.

A year after the operation the globe of the eye appeared normal, though slightly sunken and fixed in the orbit. The tension was normal and the media were clear.

Ophthalmoscopically the fundus, which immediately after the operation had shown diffuse and irregular retinal hæmorrhages, now showed almost complete disappearance of the retinal vessels, only traces of which could be made out. The papilla was occupied by a large, irregularly-shaped black patch, and the whole fundus showed degenerative changes.

Macroscopically the tumour was the size and shape of a large olive, and incorporated the whole length of the orbital portion of the optic nerve, with the broadest end anteriorly just behind the eye.

Microscopically the pia mater was throughout its whole circumference almost unrecognisable, being nearly completely degenerated and occupied by the tumour, thus showing that the latter had originated from this membrane. From the pia it had spread inwards into the nerve and outwards, had filled the sub-arachnoid space with its cells, and infiltrated the dura, which was thickened to ten times the normal.

The cellular elements comprising the tumour consisted of nucleated endothelial cells arranged in an irregular alveolar manner by the connective tissue stroma, which isolated and surrounded groups of endothelial cells, giving the growth an alveolar appearance. The interstitial tissue of the optic nerve was markedly thickened and invaded by the growth, and in consequence the blood-vessels were compressed and many were without blood. The adventitia of the vessels was also invaded, and their perithelium showed some irregular proliferation. The optic nerve anteriorly had a diameter of 9 mm., and here it showed the most marked alteration in structure, for not only had the tumour invaded the connective tissue stroma, but had also made its way between the nerve bundles themselves, causing their degeneration. In certain areas also one could make out a proliferation of the glia and an increase of young connective tissue cells, pointing to a neuritis set up by the irritation of the concentric pressure exerted by the tumour.

The term endothelioma is one which has not been accepted by all, some preferring the term angio-sarcoma or lymph-angio-sarcoma, according to whether the tumour has arisen from the endothelium of the vessels or lymphatics. Volkmann, while admitting the possibility of endothelioma arising from the blood-vessels, thinks that growths of endothelial origin are developed much more frequently from the endothelium of the lymph spaces.

Referring to the literature on this subject, the author states that most agree in admitting that many tumours clearly endothelial at the beginning, assume later a sarcomatous form; hence he agrees with Bietti's view that there are no essential differences between endothelioma and sarcoma, and that it is impossible to fix a limit where a tumour ceases to be an endothelioma and becomes a sarcoma.

Thomson Henderson.

Scrini (Paris). **Stovaine.** *Archives d'Ophtalmologie,* June. 1905.

Luke (Edinburgh). **Stovaine.** *Scottish Medical and Surgical Journal,* August, 1905.

Since the discovery of the virtues of cocain as a local anæsthetic—a discovery in which Koller played so important a part—there have been several other drugs introduced to medicine with similar action, but none has ousted cocain from the chief place. Of all these rivals to cocain, Scrini gives the premier place to stovaine. Since its discovery by Fourneau numerous papers have been written descriptive of its action and its virtues by observers who have found it possessed of much value.

Stovaine is, as everyone knows, a synthetic product—a circumstance which naturally has its good sides as well as its worse, for since it must be uniform it cannot vary in quality. Stovaine certainly has two good features, for it is antiseptic and it is only very feebly toxic; it acts also as a heart tonic; and upon vessels its effect is to dilate.

The salt employed chiefly is the hydrochlorate, which is readily soluble in distilled water, in serum, and in saline solution. This last fact has considerable importance when it is to be used for spinal injections, but does not concern us much here. For instillation into the eye Scrini recommends that a solution in boracic lotion be employed, as the alkalinity of the tears is otherwise apt to interfere with its absorption. Should an oily solution be desired, the pure stovaine, not a salt, should be used: it is freely soluble in oil. When about five drops of a 4 per cent. watery solution of hydrochlorate of stovaine are instilled, there is a certain degree of blepharospasm and a feeling of smarting, but this is quite a transitory sensation; at the same time there is some degree of lacrymation, and when the eyelids are opened the conjunctiva is seen to be considerably injected. Some patients complain that they feel as though a foreign body were in the eye, but any such sensation very rapidly disappears and is succeeded in two or three minutes by anæsthesia; this anæsthesia extends to the cornea, and the conjunctiva both of globe and lid. The eyelids are slightly gaping, too, but not to the same degree as after cocain has been used. The anæsthesia Scrini finds to continue complete for eight to ten minutes, and then gradually to fade, so that at the end of fifteen minutes sensation is quite reestablished; if a prolongation of the anæsthesia is required, more stovaine must be administered. The integrity of the corneal epithelium seems to be in no danger from the use of stovaine unless an undue amount of it has been instilled. The pupil is affected by stovaine, though its mydriatic action is not so powerful as that of cocaine; the pupil begins to dilate about fifteen minutes after the instillation, reaches its maximum in about forty to fifty minutes, and then gradually returns to normal, which is reached in some three to four hours. The pupillary reaction to light is, however, not abolished at all; upon tension it does not appear to have any effect. As regards operative work, its vasodilating action has considerable inconvenience, but under circumstances in which a flushing of vessels is desirable the effect is advantageous. When such an operation as advancement of a muscle is about to be performed, a subconjunctival injection may without fear be used, since it is almost devoid of toxic power.

It has then a considerable range of utility for operations such as tenotomy, removal of foreign body from the cornea, excision of an epithelioma from the lid, and for many others, and besides that, stovaine may be employed to relieve the discomfort of blepharitis, iritis, and what not, and to assist in allaying the pain of subconjunctival injections.

Luke's article has not so much reference to the ophthalmological employment of stovaine: rather it deals with the use of the drug as a local anæsthetic in general. He gives a very interesting account of it first from the point of view of the scientific chemist, and then, after describing the tests to which it has been put and the investigations made into its physiological and toxic action, concludes with a summary of the advantages afforded by stovaine, certain of which we may mention here. Its low degree of toxity is one; the fact that it is a vaso-dilator and not, like cocain, a vaso-constrictor is another. The chief importance of this is that, since this is so, attacks of syncope need not be dreaded, even after injection of stovain, and patients can therefore be operated upon even in a sitting position. It is not injured by boiling; it does not cause hyperpyrexia even when injected into the meninges. It is considerably cheaper than cocain, while in analgesic power the two are about equal; if anything, the balance in regard to this point is rather in favour of cocain. One disadvantage, perhaps the only one, afforded by stovaine is that association with adrenalin is distinctly contra-indicated; the skin at the point of injection has been observed to become gangrenous when the two are injected in combination.

W. G. S.

MARCEL CHESNEAU (Nantes). **A Form of Sclerosing Parenchymatous Keratitis, probably Tuberculous.** *Annales d'Oculistique*, June, 1905.

THE idea of tuberculosis of the cornea is of relatively recent date. For a long time writers denied that tubercules could be formed in a non-vascular membrane. According to Bach there are four characteristic forms of tuberculosis of the cornea.

1, The parenchymatous type, which he attributes to the action of the tuberculous toxins on the parenchyma.

2. A sclerosing form subsequent to tuberculosis of the ligamentum pectinatum.

3. A form of keratitis starting at the corneo-scleral junction without any previous alteration of the iris or ligamentum pectinatum.

4. A form secondary to bacillary affection of the conjunctiva.

Chesneau adds a clinical variety which he calls sclerosing parenchymatous keratitis. It occurs chiefly in females; out of seven cases observed by him, only one was in a male patient, the usual age being from 24 to 28 years. None of the patients suffered from any serious uterine trouble, but all manifested a general debility; signs of hereditary specific disease were absent in all cases. The first symptom is usually a localised episcleritis situated 2 or 3 millimetres from the limbus; this is followed by a nodular parenchymatous eruption, generally at a point a little distance from the seat of the episcleritis, and a space of 1 to 2 millimetres of healthy or slightly œdematous cornea lies between it and the limbus. The number of nodules varied in each case; they may be absorbed but usually become vascularised before sclerosis sets in. As a rule there is no participation of the iris.

Chesneau considers the prognosis good, except in very serious cases, as, in addition to the ordinary general treatment of tuberculosis, he speaks most highly of the great benefit derived from the subconjunctival injection of air. He also suggests that the same local treatment may be applicable in other affections of the anterior segment of the eye. He is at present engaged in investigations on this subject, the results of which should be of much interest.

E. M. Lithgow.

Nuel (Liège). **Certain Forms of Irregular Astigmatism having Origin in the Lens.** *Revue générale d'Ophtalmologie,* August 31st, 1905.

One meets with cases in which the transparency of the cornea is just as it should be, or in which there is a very very slight haze in that structure, quite insufficient to account for the symptoms present, in which, further, the curvature of the cornea is also normal, and yet there is a considerable degree of amblyopia present. It is understood, of course, that the fundus resents no pathological appearance. At the same time, the lens is perfectly transparent, but when one illuminates the pupil, and particularly if for this purpose one employs a plane mirror, the reflex is not uniformly red, but with duller, more obscure areas in it, the aspect of the pupil alterating with the slightest change in the position of the mirror. Every ophthalmic surgeon has met with such cases from time to time; in some of these the vision is very poor, lowered even to one-twelfth of what it ought to be. Nuel has come to the conclusion that this sort of irregular astigmatism of the lens is the result of ophthalmia in infancy; at least certain cases which he has noticed point in that direction. In this connection the occurrence of anterior polar cataract and its origin, its almost invariable origin, in ophthalmia neonatorum comes immediately to one's mind. Nuel goes further than some writers, for he believes that this anterior polar cataract may be produced as a result of the inflamed and infiltrated state of the cornea during the period of such an ophthalmia, even without actual perforation and consequent contact of lens and cornea. He does not, however, recall having noticed any case in which mere acute conjunctivitis of the new-born, without corneal complications, has caused cataract.

The author has carefully watched the further history of his patients with ophthalmia neonatorum, always causing the parents to bring them back at intervals, and has found that this astigmatism of the lens appears first some weeks, perhaps a month or two months, after recovery from the ophthalmia. He is thus, he believes, in a position to assert that this serious astigmatism is caused by ophthalmia neonatorum, or at the very least that its occurrence is encouraged by it, whether there has been perforation of the cornea or not ; whether there has been any implication of the cornea whatever or not.

In discussing the explanation of the occurrence of this change in the lens, he recurs first to the formation of anterior polar cataract, pointing out that this, as has now been proved many times, is due not to a mere deposit on the anterior face of the capsule, nor, properly speaking, to an opacity of the lens tissue posterior to the capsule, but to the deposit of opaque laminated substance insinuated between the capsule and the anterior epithelium of the lens proper. He next points out that round the small white dot which occupies a mere fraction of the pupil lies a relatively large area, perhaps equal to nine-tenths of the whole, in which the lens is transparent, no doubt, but with its refraction highly irregular. In point of fact it is not, says Nuel, the actual cataract which is the cause of the amblyopia, and in this statement he is perfectly correct, but the extremely irregular astigmatism of the lens. If one admits this to be true in the cases in which a cataract is present manifestly, it may also be true where there is no actual opacity.

Further, as regards the origin of the condition, he quotes Collins and others as explaining the occurrence of anterior polar cataract as due to prolonged contact of the lens with the ulcerated cornea on the escape of the aqueous humour, but says with justice that this explanation is unsatisfactory in that it does not take into account the cases, which certainly occur, in which anterior polar cataract forms, and yet there never has been perforation of the cornea at all, the anterior chamber has never been empty, the lens has never been in contact with the cornea at any time. The explanation which he prefers may be thus briefly put :—During the keratitis (or it may be the ulceration of the cornea) certain phlogogenic substances secreted by the microbes which are in the meshes of the cornea find their way into the aqueous humour (among other places). There they attack the iris, no doubt, but also, and for present purposes more particularly, the unprotected pupillary area of the lens, penetrate the epithelium of the capsule, causing proliferation of cells and the consequent formation of this peculiar form of cataract. In the infant the anterior chamber is—unlike the condition in the adult—relatively shallow at the centre of the cornea, which here is weaker at any rate; the phlogogenic substances have thus an easier route than they have in the adult to the epithelium of the lens,—a fact which helps to account for the relative rarity of such cataract in the adult. Objection might be made that if this were true a larger area of the lens ought to be affected and not merely a dot at the centre, but it should be remembered that in the new-born infant the pupil is extremely small; the iris covers and protects a much larger area of the anterior surface of the lens than it does at a later period.

Nuel finds a singular confirmation or support for his views in the observations of Huwald, who has recorded cases in which an eye has been stung by a bee, the sting penetrating no deeper than into the aqueous chamber, or even merely into the substance of the cornea, and yet as a later result of this accident anterior polar cataract has been developed—the effect of the injurious action of the "intoxicated" aqueous humour upon the exposed portion of the lens surface.

If, then, it be the case that certain phlogogenic or toxic substances are capable, whether in cases of bee-sting or of conjunctivitis or keratitis from local septic infection, of giving rise to the formation of an actual opacity of the lens in the most susceptible region, viz., that exposed in the pupillary area to the most free action of the toxin, it is not difficult to understand that a similar influence may cause an irregularity of the refracting action of the fibres in that neighbourhood, resulting in irregular astigmatism.

If we do admit, then, as Nuel would have us admit, that ophthalmia neonatorum, even without perforation of the cornea, and even without keratitis at all, is able to give rise to this irregular astigmatism and to consequent grave defect of vision, this fact should stimulate us to be more zealous to cure quickly any such case, and, above all, to keep the conjunctival sac constantly emptied of the pus which is the medium and conveyance of the injurious substance.

W. G. S.

WICHERKIEWICZ. **Acute Dacryo-adenitis.** *Archives d'Ophtalmologie*, June, 1905.

THE diagnosis of acute inflammation of the lachrymal gland is rarely made, but perhaps, says Wicherkiewicz, the disease may in reality be more frequent than is supposed, for it may not always be correctly interpreted. It is, singularly enough, barely mentioned in German text-books, but a good description of the disease was given by Panas in his well-known treatise. Briefly, diagnosis depends upon the occurrence of a swelling, often phlegmonous, situated at the outer end of the upper eyelid, and being sometimes accompanied by a slight degree of exophthalmos. The overlying skin is reddened, and there is œdema of the conjunctiva, but no increase in its secretion. Sometimes, but not always, there is a good deal of pain; the enlarged and swollen gland can usually be felt under the ridge of the orbit, either with or without eversion of the upper eyelid. The condition may last two or three weeks, and usually ends in resolution, the gland remaining a little thickened, but in a few cases there is suppuration. Some observers ascribe the rarity of this termination to the (supposed) antiseptic action of the lachrymal secretion. There are seldom any complications, but in one case the neighbouring external rectus muscle became also inflamed and paretic for the time being, with a convergent strabismus.

There is little definite information to be had regarding the etiology of the adenitis. In a series of cases collated by Maklakoff, he found it to follow influenza 16 times, gonorrhœa 5 times, syphilis 3 times, rheumatism and mumps twice each, leucocythæmia, diphtheria, erysipelas, and trachoma once each. He divides the cases of adenitis into acute (occurring in persons aged from 8 to 20 years) and chronic (occurring in persons from 35 to 50 years of age). In addition to those causes dependent, as above, upon the general health, Wicherkiewicz would add that of traumatic influence, which is perhaps chemical or due to a local infection—which, one cannot say. While the cases in the former class are usually bilateral, those in the latter are, of course, unilateral; in one of his the author states that a period of four months elapsed between the injury and the adenitis. In making a diagnosis it may not be very easy to distinguish between inflammation of the lachrymal gland on the one hand, and periostitis of the orbit, hordeolum, inflamed chalazion, or hypertrophy of the fat and cellular tissue of the orbit on the other, but periostitis is much more painful than adenitis, chalazion and hordeolum are more definitely connected with the eyelid itself, which is therefore more tender on palpation, while the overgrowth of fat and cellular tissue is non-inflammatory. When adenitis is traumatic it almost always becomes suppurative—a result at variance with that which has been found to arise in the spontaneous form.

When the disease is of non-traumatic origin, but follows influenza, etc., it is often, indeed most frequently, accompanied by inflammation of the salivary glands, and, generally speaking, but not always, the parotitis appears first. In Wicherkiewicz's experience the condition never goes on to abscess formation, but the swelling is often very great, so great that the gland cannot be palpated at all. In this form, too, pain is not a symptom,—there may be a little uneasiness from the swelling, but that is usually the worst of it. If there is any doubt whether the case is one of leucocythæmia examination of the blood with the microscope will resolve it, but it is right to bear in mind the possibility of a lympho-sarcoma being present, and not to give a good prognosis too hastily. To the causes enumerated above, such as influenza, the author adds tuberculosis, malaria, iodism, and "nervous influence."

W. G. S.

PERCIVAL J. HAY (Birmingham). **Studies in the Light Sense.** *Archives of Ophthalmology*, March, 1905.

HAY publishes an interesting and valuable article on the light sense. In his paper he embodies notes on the work of other observers, an illustrated description of a photometer of his own design, with remarks on its use, and notes of his experience in the application of his instrument to clinical work. Since the experiments of Bjerrum the light sense has been studied by the separate examination of the light minimum and the light difference. The minimum stimulus capable of being perceived marks the light minimum (L. M.), and may be ascertained for colourless light or for coloured light. When coloured light is used it is found that the threshold of sensibility is at first reached by a sensation of colourless light, and that the recognition of colour comes only after a certain increase in the degree of illumination has been reached. If the intensity be increased beyond certain limits the whole spectrum becomes colourless. The interval between the perception of light and the recognition of colour is called the photo-chromatic interval; this is greatest for green and almost absent for red. A minimum sensation is reached in light of short wave lengths with a lower intensity than in light of long wave lengths. The light difference—the minimum difference capable of being distinguished—can also be estimated for colourless or for coloured light. It is still a moot point as to whether the light sense is equal all over the retina. Krienes regards the macula as a relatively night-blind region.

In diseased conditions, Förster, employing his own photometer, found an increase in the light minimum in affections of the choroid and outer layers of the retina, as compared with conditions primarily affecting the nerve elements.

Bjerrum made observations on the relative change in the light minimum and light difference in various pathological conditions. He found that in some diseases—for example, optic atrophy—the L. D. was relatively increased, while in others—for example, choroido-retinitis,—the L. M. was more affected.

Hay's photometer consists of a tube, one meter in length, to one end of which is attached a light-tight box containing a standard candle. The tube contains the mechanism of the instrument, the essential part of which is an arrangement of Nicol prisms. There are two pairs of Nicol prisms, so arranged that while the light from the candle is polarised by passing through the first pair, the second pair can be employed as an analyser by which all light can be shut off or any desired amount permitted to reach the patient's eye. By this means the operator can graduate the amount of light reaching the patient's eye from $^1/_{900}$ upwards through 900 degrees. The instrument is further fitted and adapted to its purpose so that it may be used to test the light minimum or the light-difference with colourless or coloured light, as desired. The results obtained by the author with his own photometer are summarised by him as follows:—

"Refraction errors, if low, do not affect the light sense; if high, tend to increase the light-difference. Vitreous opacities increase both the L. M. and the L. D. Choroiditis, other than syphilitic and disseminated choroiditis, affects both light-difference and light-minimum. The light-minimum is generally more affected than the light-difference, but not invariably so. The implication of the light sense seems to vary in extent according to the position of the lesion. It appears to be more impaired if the lesion is close to the macula. Glaucoma chiefly increases the light-difference. An increase in the light-difference may be one of the earliest signs of the disease. Optic atrophy generally affects the light-difference, but there are cases in which the light-minimum is very much increased. Retinitis increases both the light-minimum and the light-difference. Affections involving the internal layers of the retina more than the external ones do not seem to affect the light sense as much as those situated in the external layers."

In conclusion, Hay emphasises the importance of testing the light sense, and of doing so with a sufficiently delicate instrument.

A. H. H. Sinclair.

Lagrange. **The Improvement of Ocular Prothesis by the Grafting of a Rabbit's Eye.** *Archives d'Ophtalmologie*, July, 1905.

Lagrange thinks the present methods of treating the socket after enucleation are capable of improvement, and for this reason places before us as a procedure worthy of more extensive practice his experience of grafting rabbits' eyes into the capsule of Tenon. To gain success attention to the following points is most important:—

1. In enucleating the diseased eye threads should be passed through each of the recti to prevent retraction.

2. All hæmorrhage must be arrested before the graft is made, the presence of blood being opposed to union.

3. The eye which should be selected is that from a medium-sized young rabbit. Careful asepsis must be observed during enucleation.

4. The eye should be inserted into the capsule, and over it the muscles sutured in pair with fine silk or catgut sutures.

Care should be taken that the muscles are well spread out over the surface of the transplanted globe.

5. The conjunctiva is then to be stitched over the muscular sutures. The latter cause Tenon's capsule to slide forward over the globe.

6. An ordinary protective bandage is to be applied; conjunctival sutures to be removed after about seven days.

7. In placing the globe the cornea should be directed backwards so that the muscle sutures may rest on the more resisting sclerotic rather than on the cornea. Lagrange had two failures on account of this precaution not having been taken. The sutures ulcerated through the cornea.

8. To avoid tension of the capsule the transplanted eye must be as nearly as possible of the same size as the one removed.

When an eye is removed for an acute inflammation, *e.g.*, panophthalmitis, acute irido-cyclitis or absolute glaucoma with inflammation of the globe it is useless to try to graft an eye.

Of the eleven cases recorded by Lagrange, eight were quite successful. Two were lost on account of the cornea sloughing under the sutures, and one on account of infection of the capsule.

H. C. MOONEY.

E. LANDOLT (Paris). **Insufficiency of Convergence.** *Archives d'Ophtalmologie*, July, 1905.

LANDOLT here relates a case of insufficiency of convergence which he treated successfully by advancement of the internal rectus.

The patient, aged 13, complained of asthenopia. The left eye had 0·50D. myopic astigmatism, while the right eye was emmetropic. Acuteness of vision and accommodation were normal. On examining the range of convergence it was found that the child had binocular vision between 40 and 50 c.m. from the eye. Positive convergence amounted only to 2·5 meter angles instead of the 9 m.a. found normally, and the normal negative convergence of 1 m.a. did not exist; in fact the visual lines fell short of parallelism by 1·75 m.a. After advancement of the internal rectus the amplitude of convergence steadily increased until about two months after the operation, when it had reached 13·75 m.a. instead of the 10 m.a. that are sufficient for most people.

Before the patient came under Landolt's care she had been with a confrère, who had tenotomised the external rectus. Landolt anticipated having to re-attach the external rectus to its normal insertion, but first advanced the internal with a view to recovering by this means as much positive convergence as possible: but as matters turned out the re-attachment of the externus was not called for.

H. C. MOONEY.

CLINICAL NOTES.

THE SERUMTHERAPY OF ULCUS SERPENS.—Römer's method is based on the assumption that all cases of this disease are due to the pneumococcus and that he considers that the intramuscular injection of dead cultures of pneumococci is an effective cure if undertaken sufficiently early. So convinced is he of its efficacy that he has initiated a scheme in Lower Franconia (North of Bavaria) by which every medical practitioner is officially informed of his methods, so that every case of threatening spreading ulcer may be treated by injection without loss of time. The expenses attendant on obtaining the cultures in the case of poor patients are, it seems, to be borne partly by public funds, partly by private subscription. It is to be hoped that this commendable willingness on the part of public authorities to co-operate with the medical profession may not prove premature.—*Archiv für Augenheilkunde*, June, 1905.

HYALINE DEGENERATION OF THE CONJUNCTIVA.—A case of this disease was fully described by Herbert in 1902 (*Trans. Ophthalmic Society*, Vol. xxii.). Parsons, in his "Pathology of the Eye," says it is exceedingly rare, except in Russia. The present case occurred not far from the Russian frontier. In the histological description of the piece of excised conjunctiva stress is laid on the extent to which the vessel walls were affected, and the surmise is given that the origin of the disease may be an excretion of hyaline substance into the vessel walls leading to secondary proliferation of the connective-tissue. The paper is not illustrated.—*Archiv für Augenheilkunde*, June, 1905.

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THE GIANT MAGNET.

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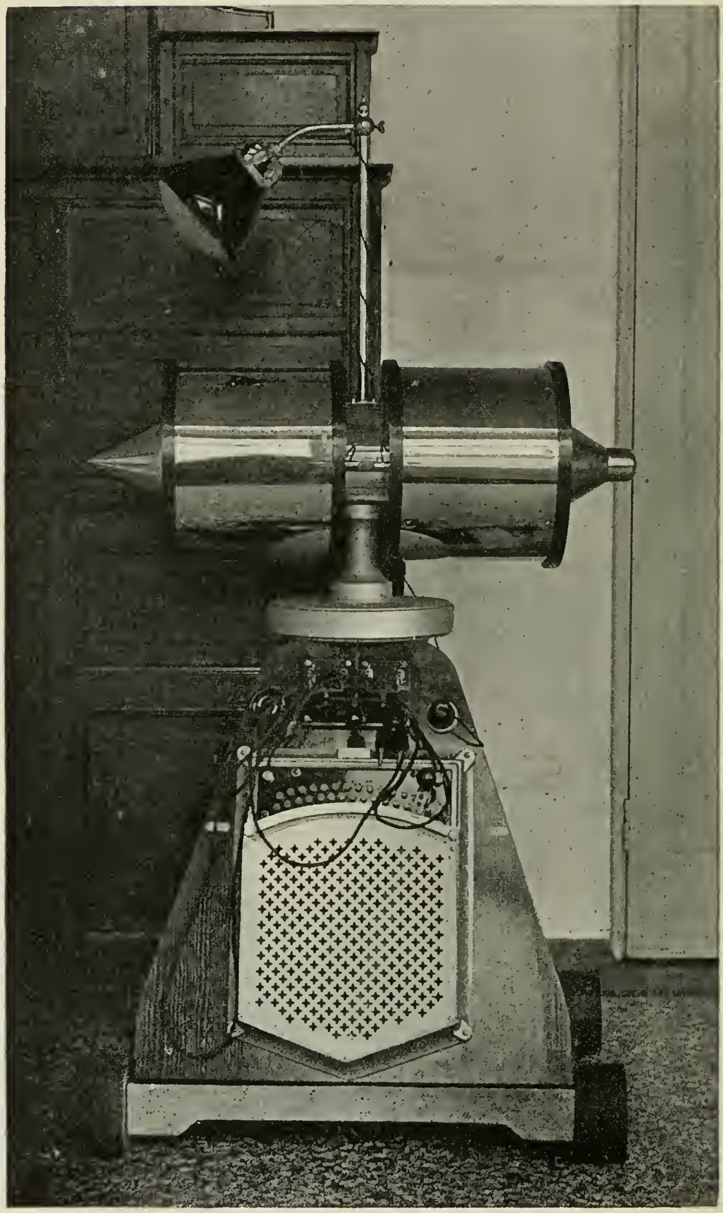
As the conclusions drawn from the use of the large modified Haab's electro-magnet may be of interest to the readers of this journal, the following account is presented. The statements made are based upon statistics obtained from a tabulation of the cases at the Manchester Royal Eye Hospital, under the care of Dr. A. Hill Griffith, by whose kind permission and suggestion this article is written.

Our magnet has been in use since September, 1903, and was made by Messrs. John Hunter and Co., electrical engineers, of Liverpool. The magnet, a photograph of which is shown below, consists of a core of annealed soft iron which is encircled by two coils. The coils are wound to carry a current, obtained from the main, of six amperes, but, by means of a resistance situated at the side of the stand, the strength of this current can be reduced from six to three amperes, and consequently the pull of the magnet can be varied at will.

With a current of six amperes passing through the coils the magnet can exert a pull of 30 lbs. per square inch sectional area, when the object which is being attracted is at a distance of one inch from the point. The magnet is mounted on a stand which permits of free movement of the former in a horizontal plane. The total weight of the magnet and stand is about 6 cwts.



In all the cases in which the piece of metal could not be seen on examination a radiogram was obtained, and the foreign body, when possible, localised by means of the Mackenzie-Davidson apparatus.

In estimating the results obtained by the use of this instrument it is convenient to consider the question under the following headings:—

A. *The time intervening between the accident and the operation for removal.*

This is undoubtedly a most important factor, and we have found that the best results were obtained in those cases which were operated upon within the first twenty-four hours following the accident. Any foreign body embedded in the eye soon becomes surrounded by a plastic exudate which, though quite soft, appears to hold it firmly, and offers great resistance to its removal, even by the use of the strongest currents. This resistance was well shown in the following case in which the foreign body, a piece of steel, was localised in the ciliary region below. The metal had been in the eye four weeks. The point of the magnet was applied over the original scar for a considerable time and the strongest current used, but without any effect, either subjective or objective. The eye, which was subsequently enucleated, contained a small piece of metal which was firmly embedded in a ciliary exudate immediately behind and below the corneal scar.

Again, in those cases where the piece of metal has been in the eye some days or weeks, the amount of attractive force we require to use in order to withdraw the metal drags so much on the tissues in its vicinity that the subsequent inflammatory reaction, together with that resulting from the original trauma, reduces the possibility of a satisfactory result and undoubtedly, in some cases, brings on a marked irido-cyclitis with early shrinking of the globe.

When the piece of metal has been in the eye under forty-eight hours we have never failed, by careful manipulation of the patient's head and by the use of a gradually increased current, to effect its removal; whereas in one case, referred to above, with a four weeks history, the magnet had no effect although the metal was situated well forward in the globe.

On the other hand, we may mention a case in which the foreign body had been in the eye four months, the pupil closed and filled with exudate and the lens opaque. In this case a corneal section was made below and the eye applied to the point of the magnet, with the result that the foreign body was at once extracted. A procedure such as this is probably the best line of treatment to adopt when an attempt has failed to remove the metal.

B. *The situation of the wound of entry.*

The influence which the site of the injury has on the final result is of considerable interest and importance. We may study it under the following divisions:—

Firstly: Corneal wounds. Here the ultimate result depends on the final position of the metal. Does it rest in the lens or has it gone beyond? In our cases where the piece of metal has been situated in the lens the results, without exception, have been excellent, no eye having been lost and the ultimate vision, after treatment of the cataract, good. In one of the cases the steel was drawn forward from the posterior pole of the lens into the anterior chamber and removed by a superior corneal section. The opaque lens was extracted at the same time, and the resulting vision was $^{6}/_{12}$ and J1.

On the other hand, in those cases where the metal has passed through the lens into the vitreous chamber or become embedded in the coats of the eye beyond, the results have been disastrous. In all cases it has resulted in enucleation, either because it has been impossible to withdraw the metal from its resting place, instanced by a case in which it was embedded in the sclerotic coat between the entrance of the optic nerve and the insertion of the inferior oblique muscle, or from the injury caused by the withdrawal of the foreign body back again through an already wounded lens. In this latter group of cases there has followed a rapid and virulent irido-cyclitis.*

In some recent text-books it is taught that by means of the giant magnet pieces of metal can be withdrawn from the vitreous chamber through the pupil into the anterior chamber, whence removal is easy. Our results by this method do not encourage this mode of operation, and it is questionable whether a scleral puncture might lead to better results in some cases, more particularly in those cases in which the metal has been in the eye some time, the eye inflammation quietening down and the entrance wound healed.

Secondly: Wounds of the ciliary body or further back in the sclera. In this class of case, especially where the wound has been through the ciliary body, our results have been extremely good. We have never had to enucleate eyes wounded by pieces of metal pentrating the ciliary zone, although in all such cases the metal has rested at the back of the vitreous chamber. In one case a small triangular piece of steel passed through the ciliary body at the outer side, and could be seen with the ophthalmoscope, to be closely applied to the outer side of the optic disc. The original wound, about 2 millimetres in length and running in an antero-posterior direction, had to be enlarged slightly, both longitudinally and at right angles before the metal could be withdrawn. The resulting vision was $^6/_{12}$ and J1, and there was no evidence, on examination two years later, of any retinal detachment or vitreous opacity. The interior of the globe appeared perfectly normal.

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* This seems a rather sweeping assertion, and I desire to reserve my judgment as to its correctness. At the same time, I must admit that this statement is based on actual results obtained, and it is possible that we have still a good deal to learn as to the proper way to use this powerful instrument.
A.H.G.

Such fortunate results as these have undoubtedly been obtained by early operation, in all cases within twelve hours of the accident, the wounds were clean cut and meridianal, the toilet was vigorous and the conjunctiva carefully sutured over the wound. The wounds have healed with the minimal amount of reaction and the resulting vision has been good, considering the severity of the injury.

C. *The size and shape of the piece of metal.*

The pieces of metal may be considered as spicules, scales or "chunks." The spicules are easiest to withdraw, and this, we suppose, is due to the fact that the poles produced on the metal by the magnet are more apart in the longish, narrow pieces of metal whilst in the small rounded bits of metal the positive and negative poles are too clustered. It seldom happens that there is much difficulty in getting a long bit of metal out of a wound as one pole is drawn foremost into the lips of the wound. We have frequently had to enlarge the wounds to free the sharp points on a small irregularly-shaped piece of metal or because a small rounded scale of metal has got across the wound.

D. *The septicity of the wound.*

All chips of metal entering an eye may be considered as free from organisms, and the septic inflammations which follow injuries produced by such metal are produced by the subsequent entry of organisms, either by their migration along the track of the wound, or by their admission at the time of operation for the removal of the foreign body. This introduction of organisms is the deciding factor in all the operations, and it is here where the giant magnet is so superior to the hand magnet.

When metal has to be withdrawn from the vitreous chamber, etc., by means of the hand magnet, the armature of the latter has, in almost all cases, to be introduced into the globe, and there is thus, even when all precautions are taken to prevent infection, an element of risk. In addition, the amount of probing about in the vitreous, great in many cases, so destroys the tissue as to offer an excellent pabulum for any organisms which may be introduced at the time. Again, there is the great risk of producing a detachment of the retina, a result so frequently seen after operations performed with the small magnet. On the other hand, by the use of the giant magnet, immediate contact with the eye is not necessary—in fact is injurious—and by using a pulling force graduated by the strength of the current and the distance of the patient's eye from the point of the magnet, there is the minimal amount of tissue disorganisation, and the risk of infection from actual contact is nil.

The following suggestions might be made in using the giant magnet:—

1. In recent cases with an open wound remove the metal through that wound.

2. When the original wound has completely healed endeavour to draw the foreign body into the anterior chamber through the circum-lental space whence it may easily be removed. If this fails

3. Make a large corneal flap when it will probably be found easy to remove the metal as in one of the cases above mentioned.

All our radiograms are taken by an experienced Manchester firm. It may be stated here that we have in some cases failed to make out the presence of small foreign bodies in radiograms, when there could be no doubt as to their presence, as was proved in some cases by an examination after enucleation. This ought not to occur, and we should like to have the experience of others on this point, in fact on any point in the use of the giant magnet.

In conclusion, it may be stated that although the giant magnet has added to our means of removing chips of metal from the interior of eyes, yet there is still a place, and a very important place, for the ordinary small electro-magnet.

REVIEWS.

A. von Hippel (Göttingen). **Operation for Myopia.** *Deutsche Medizinische Wochenschrift*, 29, 1905.

Opinions concerning the value of the myopia operation have undergone many changes in the fifteen years which have elapsed since its practical application by Fukala.

Received at first with a certain amount of distrust, it soon attracted numerous adherents, many of whom in their enthusiasm certainly went too far, and overlooked the dangers which are always to a certain extent associated with it. A reaction against such a condition was bound to follow.

Hirschberg,[1] who has himself only performed the operation twenty-four times, considers it on account of its possible consequences so risky that since 1901 he has ceased to employ it. Schmidt-Rimpler[2] has not completely discarded it, but comes to the conclusion based on his observations in the Eye Clinic in Halle, "that more highly myopic eyes perish through the Fukala operation than without it," and requires therefore particularly rigorous indications for its employment.

This last demand I agree to unconditionally, and have already, in 1904, expressed myself as follows:—"I consider the operation permissible only for such patients as by their shortsightedness are disabled for work, and cannot tolerate the correcting glasses. In these cases I hold the opinion, based on my experience, that the operation is not only permissible but highly to be recommended provided that no contingent changes exist in the eyes besides the myopia, which appear to render the attainment of useful vision hopeless." In this I find myself in consonance with Sattler, who, like myself, has at his command extensive material for observation.[4]

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1. Die Behandlung der Kurzsichtigkeit. Deutsche Klinik, 1904.
2. Münchener medizinische Wochenschrift, 1904, No. 38.
3. v. Graefe's Archiv für Ophthalmologie. Bd. 49, p. 403.
4. Deutsche medizinische Wochenschrift, 1904. No. 17 and 18.

Hirschberg, like Schmidt-Rimpler, brings against the myopia operation a series of objections to the validity of which I can only partly agree. Essentially there are four, which they both specially accentuate :—

1. The possibility of infection. There is no more danger in this than in any other intra-ocular operation, if one has sufficiently mastered the technique, and uses chloroform for restless patients so as to avoid a loss of vitreous humour.

2. The development of a rise of intra-ocular pressure by rapid swelling of the lens after the discission. This has only a serious significance when it assumes a glaucomatous character—in my experience an excessively rare occurrence, which one can easily avoid by puncture of the anterior chamber and evacuation of the swelling lens.

3. Hirschberg perceives a third danger in a "detachment of the retina which, arising months or years after the operation, principally affects the central region of the fundus oculi"; Schmidt-Rimpler in a central chorio-retinitis which he had observed in a patient operated on by me in Halle. How one can debit the operative interference with such later-appearing affections is to me incomprehensible. According to my view they depend exclusively on the progressive myopia through the associated pathological changes at the posterior pole of the bulbus oculi; indeed we see them at least equally frequently in highly myopic eyes which have not been operated upon.

4. The weightiest objection against the operation is seen by the above-named authors in the danger of a detachment of the retina. Upon the greatness of this danger authorities have up to the present failed to agree because, in my opinion, the greater number have not gone the right way to reach a properly substantiated conclusion. Even when Hirschberg states emphatically that in Berlin he has seen many eyes blinded through retinal detachment which had formerly been operated upon in other places on account of myopia, it seems to me that this fact does not allow of a conclusion so far reaching, as one is not informed in every individual case of the course of the operation and recovery from it. It will certainly be found that in many

of the cases the evil result has been caused by the deficient technique and insufficient experience of the operators, also others will be found in which the causal connection between the amotio and the operative interference is not proved with certainty.

But another factor still must not be neglected in estimating the frequency of amotio in these cases. The successfully operated cases have no reason for presenting themselves again at the clinics—those blinded from detachment of the retina wander from one to another and finally terminate at the metropolis of Berlin because they imagine that there they may still find help for an ill which has everywhere else been pronounced incurable.

The observations of Hirschberg upon the frequency of amotio after the myopia operation can therefore by no means lay claim to universal validity, moreover they give absolutely no information concerning the percentage proportion between the successful and the unsuccessful cases. Schmidt-Rimpler finds the chief support for his view in the occurrence of amotio in a number of cases formerly operated on by me. I am sincerely thankful to him that he has made me acquainted with every unfavourably terminating case. In my opinion we will only through systematic collective investigation arrive at a sufficiently certain judgement upon the danger of amotio after the myopia operation. It seems to me needful not to be content with the verification of an amotio merely, but in every case to enquire whether it took origin in an "abnormal" operation or whether the high myopia is to be made solely responsible. These aims would be accomplished if all who have frequently performed the operation would in the course of years re-examine their patients; or at least acquaint themselves as to their condition after the lapse of a few years.

Schmidt-Rimpler seems, if I interpret him correctly, at present inclined to the view that the operation should be blamed for every amotio even when occurring years after. Some years ago, however, he entertained a different view, for in his work in the *Therapie der Gegenwart*, 1899, he thus expresses himself:—"If after 10 or 12 months no hurtful results follow a properly healed operation we are justified in not expecting them later."

I hold this opinion to-day, and consider that there is absolutely no justification for seeing in the removal of the lens the cause of every amotio appearing years after. The well-known changes in the interior of highly myopic eyes, changes that are beyond control, suffice in my opinion for the later occurrence of amotio in so many patients.

The attempt to answer, by means of statistics, the question whether the amotio occurs more frequently in operated than in unoperated eyes, has hitherto failed to reach a certain result because there is absolutely no agreement between the percentages estimated by different authors. In my opinion we will only elucidate these points from a uniform point of view through the associated investigation of all the great public and private polyclinics.

If one investigator includes in his statistics myopia from 6 D onwards, and another from 10 D or 12 D onwards, the results are obviously not comparable, and the whole work has no result. Again, it is obvious that where the numbers investigated are too small, accident plays too great a rôle.

On investigation of the records of 69,313 patients, I find detachment was observed in 6·7 per cent. Since lower degrees of myopia give no indication for the operation, for really comparable results we need to include in our statistics only those that are qualified for operative interference, say at least 14 D onwards.

From 1893 to 1905 I have performed the myopia operation on 275 eyes, 65 times bilaterally, 149 unilaterally. I classify thus those of the patients whose cases I have been able to follow up:—

OPERATED ON

12 years ago	11 years	10 years	9 years	8 years	7 years	6 years
8 eyes	4 eyes	15 eyes	8 eyes	27 eyes	30 eyes	14 eyes

5 years	4 years	3 years	2 years	1 year	less than 1 year
28 eyes	28 eyes	24 eyes	32 eyes	35 eyes	10 eyes

Twelve patients with just as many operated eyes, who had all obtained good vision, did not report themselves after dismissal from the clinic, and my interrogatory letters failed to reach them.

There remain therefore 263 eyes about which I have exact information. In 23 of these, the occurrence of amotio was authenticated in course of time partly by myself, partly by the assistants of Schmidt-Rimpler, and in two more cases I consider its appearance probable. I thus find 25 retinal detachments in 263 operated eyes, *i.e.*, 9·5 per cent.

On superficial examination these figures naturally appear to be terribly high, nevertheless, if we take more closely into consideration the conditions under which the amotio developed in these patients we will easily see that in half the cases the operative interference certainly cannot be made responsible for the evil result. This is evident from consideration of the length of time which elapsed between the operation and the occurrence of the amotio.

9 years	8 years	7 years	6 years	5 years
1 eye	1 eye	1 eye	1 eye	2 eyes
4 years	3 years	2 years	1 year	less than 1 year
2 eyes	4 eyes	3 eyes	3 eyes	7 eyes

Unbiassed consideration of this table must, in my opinion, lead one to the conclusion that in a great proportion of the eyes the amotio was caused by the high myopia and not by the removal of the lens. The influence that the latter has on the circulatory condition of the eye is certainly compensated for in the course of a year. Where, therefore, the operation succeeds without complication, especially without loss of vitreous, or severe injury to it, we cannot attribute a belated amotio to it in any way, and still less when for an intervening series of years the patient has used his operated eyes for near work.

The fixing of a definite time limit from which onwards to consider the amotio as spontaneous is to a certain extent arbitrary, but I believe we give it ample margin if we take as such the beginning of the third year after the operation. Under this supposition the operative interference can be considered as the possible cause of the amotio thirteen times amongst my patients. I can comprehend it as such in seven eyes in which I, yielding to the importunity of the patients, undertook too frequent operative interference. For years I have, in common with most of my colleagues, avoided it as much as possible.

In the six other eyes neither the operation nor the after treatment showed any direct cause for the occurrence of amotio, and its origin therefore seems to me doubtful. I now place against this my experience on operated cases, the results of our statistical examination. This gives the following results. Amongst 100,000 polyclinic patients 529 were found with myopia of 14 D and over (=0,53 per cent.). They possessed 842 myopic eyes, in which a spontaneous detachment was authenticated 53 times, this also equals 6·3 per cent. of all the cases. This percentage is still probably considerably too small—because I could not include in my statistics a whole series of unilateral detachments, any exact statement of the condition of the other eye being omitted in the polyclinic records. Only those cases are included in the table in which the seeing eye had a myopia of at least 14 D.

On account of the magnitude of the material elaborated I consider it improbable that accident can essentially affect the percentage ascertained, the more so as my earlier statistical investigation in Halle on about 69,000 patients led to the very similar 6·7 per cent.

If we are therefore allowed to consider it proved that of all highly myopic eyes which might come within the scope of the Fukala operation about 6·5 per cent. suffer from spontaneous detachment, then every right disappears for laying the blame on the operative interference purely in 9·5 per cent. of my operative cases.

Five years ago I asserted that one would only arrive at a certain judgement concerning the frequency of amotio in operated and unoperated eyes, if one in a sufficiently great number of unilaterally operated cases, would later authenticate the condition of both eyes with reference to this question.

By this investigation of my patients I come to the result that in the 149 cases 7 of the unoperated (4·7 per cent.) eyes and 9 (counting in the two not absolutely authenticated cases) of the operated eyes (6 per cent.) suffered from amotio, the difference is also not considerable. I quite understand that my numbers are not sufficiently large to settle with certainty the question occupying us. Nevertheless, I make the communication because it may possibly lead other colleagues to an analogous publication of their experience. The material of one individual does not suffice. In this as in many other clinical questions we will only by methodical collective enquiry find our way out of the region of subjective conjecture and unfounded hypothesis, and reach the certain foundation of positive science. I believe I have thus produced proof that Hirschberg's position of aversion to the myopia operation is not sufficiently grounded. In selected cases, and when carried out with the necessary caution, it secures to myopes of the highest grade the ability to work and to enjoy life. If a small proportion of these lose the newly-acquired good sooner or later by the onset of retinal detachment, the overwhelming majority retain good sight. The failures will become rarer the more experience one collects, the better one learns to suit the operative technique to the individual case. The wider developments of the method must be our aim, not the sacrifice of an operative procedure which has already in thousands of cases proved itself to be of unique value.

(Translated by Robert Pulleine, M.B., Sydney).

Zirm. **Tetany Cataract.** *Archiv für Augenheilkunde,* June, 1905.

The connection between a liability to attacks of muscular spasm and the development of a non-senile form of cataract has been observed several times (*cf. Ophthalmic Review* for 1899, p. 154), and different interpretations of the connection have been suggested. According to Peters, the degeneration of the ciliary processes and the consequent increased amount of salts contained in the aqueous humour is the immediate cause. Zirm records six cases observed during a month; four of them occurred in young women between the ages of 26 and 32, as a sequence of an exhausting illness (in three cases in connection with childbirth, in one following typhoid fever). A fifth case occurred in a strong healthy young man of 22, in whom no cause for the attack of tetany could be discovered except unusually hard muscular work. The last case occurred in a woman of 41 in connection with pregnancy. In all these cases there was a history of the hair having completely, or nearly completely, fallen out about the time of the attacks of tetany. In all but one the nails also necrosed. In one case there was a skin eruption resembling pemphigus. These disturbances of nutrition, affecting nails, hair, skin and crystalline lens,—all epithelial structures, are regarded by Zirm as various manifestations of a common cause,—that cause being a toxin which also produced muscular cramps, including cramp of the ciliary muscle. According to this view, this last did not bear any direct causal relation to the cataract, but was a parallel manifestation of the same cause.

A. H. T.

PROF. ERNST FUCHS. **Sympathetic Inflammation.** *v. Graefe's Archiv für Ophthalmologie*, lxi., 2, p. 365.

IT is impossible to give more than a very imperfect resumé of this important paper which, like all else that has been written by Prof. Fuchs, deserves to be studied in the original.

The subject matter of the present paper is not the etiology, nor the transmission of the disease, but the pathological anatomy of sympathetic inflammation as it is found in the exciting eye. Does it differ in any essential respects from what Prof. Fuchs has described as septic endophthalmitis? (*vide Ophthalmic Review*, 1904, p. 294).

On this point there can now, after the present observations, be no doubt, when we read the remarkable statement that Fuchs has been able to pick out from the multitude of eyes sectioned in his collection all those with the lesions considered to be typical of sympathetic disease, and has subsequently discovered in the clinical records that all these eyes had actually set up sympathetic ophthalmitis, and that none of the other eyes examined had done so. (Of these eyes one had caused merely irritation, and there was an additional eye in which Fuchs at first had failed to detect the sympathetic inflammation.)

Thirty-five cases in all were found showing typical inflammation, in all of which the second eye had sympathised.

Fuchs here attempts to calculate, from an examination of all the eyes which had been removed for fear of sympathy during the twenty years of his Viennese professorship, what the chances of sympathy are after severe injuries. Excluding from the list eyes removed within fourteen days of the injury (or operation), there were 200, and of these only 29 actually produced sympathetic disease. (Six cases have to be excluded from this statistic, three as not being Fuchs' patients, and three as being cases of sympathy caused by chorioidal sarcoma.) After this and some other corrections are made, Fuchs' conclusion is that 13 per cent. of eyes destroyed by injury, operation or large perforating ulcer actually set up sympathetic disease.

That there are several sources of error in the above statistics is obvious, and Fuchs is careful to point them out. But we may conclude that some 80 per cent. of eyes enucleated are not likely to set up sympathy if untouched.

Then follows a description of the anatomical changes in the thirty-five eyes which had actually caused sympathy. Of these, eleven were cases of perforating wound, eight of scleral rupture, in two of which the rupture was sub-conjunctival, four of cataract operation, three of iridectomy, three of perforating ulcer, three of chorioidal sarcoma (without perforation of sclerotic).

In the sarcomatous eyes the starting point of the inflammation was a necrosis of some portion of the tumour, which set up severe irido-cyclitis.

It may be noted that sympathetic chorioiditis was observed in six cases during the twenty years.

As regards the interval which elapses between the inflammation of the first and the sympathy of the second eye, the shortest interval observed was three weeks, but the most usual course was an interval of from four to six weeks. Six cases showed an interval of between six weeks and one year, and four of more than one year, indeed one an interval of twenty years.

The observations afford no ground for assuming that the length of the interval has any influence upon the severity of the sympathetic inflammation, no more than clinical experience shows different effects from early and from late enucleation.

Fuchs also finds no definite relation between the severity of the inflammation in the exciting eye and the course of the sympathy in the other.

A minute description of the changes found in the thirty-five eyes is given, for details of which the original must be consulted. Suffice it here to state that the cells observed consisted of small mononuclear round cells, epithelioid cells and giant cells. The small round cells were similar in aspect to the cells known as leucocytes. The epithelioid cells were derived from the normal cells of uvea, or from the cells of the blood-vessels, or from ordinary connective-tissue cells, and also from the retinal pigment cells. Giant cells were found in about half the eyes, springing from the epithelioid cells, and not apparently of pathognomonic import. In addition polynuclear leucocytes, mast-cells and hyaline bodies (Russell bodies) were sometimes present.

As regards the different tissues of the eye, the iris is the part of the uvea which generally shows least infiltration, though clinically of course its changes are most manifest. The ciliary body was always affected, in two cases to a very trifling extent. The inflammation in this region differs from septic endophthalmitis in the following points:—The cellular infiltration begins beneath the intact retinal layers, and destroys the outer of these layers, while the inner remains intact. In endophthalmitis the first exudation cells are found upon the inner surface of the retinal layers, of which the inner is soon destroyed, while the outer, as well as the ciliary body, shows at first but little cellular infiltration.

The chorioidea is the portion of the uvea which is usually most severely affected. In none of the cases was it intact, and usually the posterior portion was more affected than the anterior. The lymphocytes are first seen in the layer of large blood-vessels, and spread through the whole tissue, leaving, as pointed out by Brailey, the chorio-capillaris intact for a considerable time.

The vessels of the whole uveal tract affected are gradually destroyed by an invasion of leucocytes which infiltrate their walls, and finally close the lumen completely with or without visible proliferation of the endothelium. These changes could be observed also in vessels (veins) passing from the supra-chorioidea into the sclerotic.

Septic endophthalmitis differs from sympathetic disease in the chorioidea, being the least affected part of the uvea, and the same points as were noted in the case of the ciliary body hold good in these case of the chorioidea.

While it is unusual to find the infiltration spreading inwards from the chorioidea, it is the rule to find it spreading outwards through the supra-chorioidea into the sclerotic.

The retina and optic nerve are of course infiltrated, but the infiltration is not, in Fuchs's opinion, characteristic of sympathetic disease.

The infiltration in course of time becomes organised, so that the uvea becomes merely a fibrous membrane.

What has been so frequently assumed to be the cause of sympathy, a plastic inflammation, has not yet been mentioned. This was present in the great majority of Fuchs' specimens, but all the same he does not regard it as an essential factor in sympathetic disease. It may not be present in the most typical cases, and may be looked upon as a chance complication.

In support of this contention Fuchs remarks that sympathetic inflammation probably arises from an agent acting on the tissues, as tuberculosis and syphilis, and therefore produces as they do an infiltration in the tissues, and not on their surfaces; but, just as in syphilis, a plastic exudation may occur secondarily, so may it in sympathetic disease. This disease as observed in its purity, viz., in the second eye, exhibits both the serous and plastic type clinically. Histologically, ten such eyes have been examined, and of these six presented little or no plastic exudation. In only two of them was there severe plastic inflammation, so that we may conclude that plastic exudation is not an essential of sympathetic disease.

Plastic inflammation is probably a chance complication caused by the ordinary pathogenic microbes, which infect the eye at the time of the injury, and it seems to run a more acute course than the sympathetic infiltration, for in Fuchs' cases it always exhibited signs of being of older date than the sympathetic infiltration. Endophthalmitis and sympathetic disease are caused by different micro-organisms, and run their courses independently, no relation existing between their respective intensities; and their pathological products are often located in perfectly distinct regions of the globe.

Endophthalmitis arises earlier, has a shorter incubation period, and runs a more rapid course. The inflammation and exudation are on the surfaces of the membranes, iris, ciliary body, and retina, and the exudation consists of fibrin and leucocytes. In sympathetic disease the fibrin is usually absent, and the tendency is for the infiltration to spread outwards through the sclerotic, which endophthalmitis does not do.

These two types of inflammation were first differentiated by Straub, who describes a hyalitis (*i.e.*, endophthalmitis) and genuine uveitis (sympathetic). Schirmer divides uveal inflammations into serous, fibrinous (plastic) and suppurative, and holds that the fibrinous may cause sympathy. Fuchs, on the contrary, separates the fibrino-plastic and suppurative completely from the sympathetic, which latter must have an infective agent, *sui generis*. In the large majority of cases there is mixed infection.

As regards terminology, probably " sympathetic " is the best term to be employed. " Genuine uveitis " or " parenchymatous uveitis " is unsatisfactory, the disease being what the pathological anatomists describe as proliferating.

In sixteen of the cases sympathetic irritation had existed, and only two of the eyes examined showed any evidence of sympathetic inflammation.

The lesions in traumatic serous iritis are very similar to those seen in sympathetic disease, and Fuchs describes three such cases in this paper, the first cases which have been anatomically investigated. In these cases the form of the cells, the nature of the infiltration, and the absence, or slight degree, of plastic inflammation was just the same as in sympathetic disease. The difference consisted in the freedom of the chorioidea from inflammation, and the absence of epithelioid and giant cells. Very similar lesions are also found in cases of spontaneous chronic iridocyclitis.

In conclusion, Fuchs' observations may be summed up :—

1. In every case of sympathetic disease of the second eye a typical inflammation was found in the exciting eye.
2. This inflammation was absent in every case of sympathetic irritation, with the exception noted above.
3. Of the numerous other eyes examined after injuries only one exhibited lesions resembling, though not identical with, the lesions of sympathetic disease. All these other eyes were affected with the ordinary endophthalmitis, with the exception of three, which were cases of traumatic serous iritis.

From the fact that among so many eyes the typical inflammation was never found except when the second eye was actually sympathising, Fuchs is led to believe that time is not necessary, but that so soon as the inflammation has broken out in the first eye it can migrate to the second eye without delay. This is contrary to Schirmer's view, and indeed to the usually accepted theory, but seems certainly justified by the facts observed by Fuchs.

The route by which the pathological factor reaches the second eye is, in Fuchs' opinion, most probably the circulation. Anatomically examined, neither optic nor ciliary nerves afford evidence of such transmission, while the manner in which the leucocytes invade the vessels, penetrate their walls, and fill their lumina in the ciliary body and chorioidea of the exciting eye force an observer to conceive the probability of metastasis, as in tumours.

It is only when, after passing through the pulmonary circulation, the infective agent reaches the suitable soil of the uveal tract of the second eye, that it is able to set up there the same inflammation that it originally started in the uvea of the first or injured eye.

J. B. S.

J. Herbert Parsons. **The Pathology of the Eye.** Part I., Vol. ii. London: Hodder and Stoughton.

This volume deals with the special pathology of the lens, vitreous, choroid, retina, optic nerve, orbit and lacrymal apparatus. The high standard set by Mr. Parsons in the first volume of his work is well maintained, and no trouble has been spared to make the contents of the present volume valuable, interesting and authoritative. Some will probably wish for more dogmatism from the author in the discussion of disputed points and in the review of conflicting theories; others will be quite content to learn what is known and what theories are held regarding morbid processes, often very imperfectly understood. Mr. Parsons is never afraid to give an opinion where he has facts to go upon, and a great deal of the most interesting matter in his book consists of his own opinions based on his own work.

Passing to consider the volume briefly in detail, we note that in regard to the supposed association of rickets with lamellar cataract, Mr. Parsons does not seem quite sure whether the affection is usually congenital or acquired. Diabetic cataract is said to be probably due to some unknown deleterious agent in the blood-stream. Römer's recent researches are of great interest in this connection, and no doubt Mr. Parsons will recur to the subject in a later portion of his work. In speaking of detachment of the vitreous, Elschnig's denial of its frequent occurrence in highly myopic eyes is mentioned, but not commented upon. In regard to vitreous exudations, Mr. Parsons makes the interesting statement, which seems borne out by facts, that probably leucocytes do not pass through the intact choroid and retina, but invade the vitreous solely from the ciliary body. The cells of the vitreous itself are so few in number that the rôle played by them can only be unimportant. Diseases of the choroid are fully treated of, and the interesting subject of choroidal tumours with their occasionally perplexing histological structure is fully discussed.

The healing of retinal wounds, a subject about which little is known, is discussed in a most interesting fashion. Mr. Parsons, whose opinions are largely based on his own experiments, considers that in a wound of the choroid and retina, the choroid and the mesoblastic elements of the retina derived from its blood-vessels play the chief part in the reparative process. The degenerative changes of the retina are well described and illustrated. Senile degeneration at the macula is included in the retinal degenerations. With regard to retinitis pigmentosa, Mr. Parsons is of opinion that the condition depends upon a primary choroidal degeneration. The subject of glioma retinæ, always of peculiar interest in regard to the question of ætiology, is discussed in considerable detail. Mr. Parsons does not seem to think that any one of the views held with regard to the origin and structure of these tumours is quite satisfactory. Personally we do not think the "rosette" formations have the essential importance ascribed to them by Wintersteiner, nor can we agree with Prof. Greeff that the main mass of the tumour consists of spider cells. The structure of hyaline bodies at the optic disc is discussed at considerable length. Tumours of the optic nerve, of the orbit and of the lacrymal gland receive full consideration. Mr. Parsons is to be heartily congratulated on his second volume, and we wish him every success with the volumes he has yet in preparation.

E. E. MADDOX (Bournemouth). **A New Operation for Moderate Short-sight.** *British Medical Journal*, October 21st, 1905.

A LAD, aged 16, was discovered, while training for the army, to be short-sighted to a degree slightly in excess of the permissible amount. As the disappointment of the youth and of his friends was naturally very great he consulted Maddox, and was treated by him by means of the pressure-massage method of Domec, which was so far successful that had the examination only been held sooner, the young man would have passed. Fortunately or unfortunately, the result was only temporary, and the patient failed to satisfy the examiners as to the state of his vision. Repetition of the same method failed to have sufficient effect, and the patient evidently became more myopic; in January, 1905, one eye, we are told, was passed with just $^6/_{24}$, and the other rejected with $^6/_{36}$. The patient was very anxious to have "something done" which would cause his myopia to cease advancing, as he had to undergo another period of study before reappearing for examination and nothing seemed more probable than that the effect of this would be an increase in his short-sightedness. Maddox then agreed to interfere surgically, which he proceeded to do in the following manner:—In January, 1905, he dissected up a conjunctival flap, threw it over the cornea, and made a large lateral incision with a broad keratome "between the reflected conjunctiva and the sclera." This incision was enlarged upwards and downwards with a probe-pointed knife. The iris prolapsed again and again at the operation, but was at last satisfactorily replaced, and the conjunctival flap was smoothed back and sutured in such a manner as to exercise considerable traction and so flatten the cornea; healing was uninterrupted and painless. Maddox, having thus begun with the more difficult meridian, the horizontal, in the beginning of April performed a similar operation upon the vertical meridian, using, however, a Graefe knife on this occasion. On August 23rd the patient passed his examination successfully.

Maddox, and still more his patient, may well be congratulated upon the success of this exploit, but the question which cannot but arise in the mind of a conscientious practitioner is,—was he justified in acting as he did? In a footnote he says that having now discovered that Domec's pressure-massage method appeared to have only an evanescent effect, he would not feel justified in practising it just before an examination for army or navy, "as it would manifestly defeat the intentions of the authorities. Operative or radical treatment is of course different." It may be, but the point in Maddox's paper is that the operation is now suggested for the first time; there can therefore be no sufficient evidence that it is other than temporray also, though the effect may last longer than is the case in the massage method.

It is in our judgment very questionable indeed from the point of view of a patriotic citizen whether it is right to use such a method or any method to enable a youth still only 17, and with evidently increasing myopia, to enter the army, and still more questionable when the method employed to reduce his disability is one absolutely untried. Maddox holds the opinion, and we agree with him, that the formation of a conjunctival flap at the operation for cataract tends to lessen the subsequent astigmatism, but this is not in any way sufficient evidence of the permanence of an alteration in the corneal curvature produced by drawing upon the flap. We do not wish to labour the point from the taxpayer's point of view, but is there any good sense in adopting such measures to enable such a person to become a soldier?

We turn from that point, and find even less to recommend the operation from the medical side. To increase vision from $^6/_{36}$ (?without glasses) to somewhat more (how much is not stated) two operations were performed, each of which gravely risked the patient's vision. Apart from the more terrible results of suppuration and of sympathetic ophthalmia, neither of which can be regarded as a result altogether impossible, prolapse of the iris was evidently an imminent danger, and the young man might very easily, even through no fault in the technique of the operation, have been left with an unsightly eye and very much worse vision than he had before. For the great gain in vision, in convenience, in, as some say, security from further advance of a "malignant" myopia, it may be permissible, it may even be desirable, to run considerable risks by operation, but these conditions do not apply to such a case as this which we are at present considering. We may admire Maddox's skill, temerity and success as an operator, his ingenuity in devising a method of relief from a serious inconvenience, and his hopeful courage as a peaceful citizen, but our high opinion of his professional wisdom has, we must confess, received a rude shock.

W. G. S.

Robert Stern. **Fixation of Retinal Purple.** *v. Graefe's Archiv*, lxi., 3.

A satisfactory method of fixing the retinal purple for microscopic investigation has long been a great desideratum in ophthalmological laboratories, and if Stern's method proves as successful in the hands of others as it has in his, this want will be supplied. The chemical agent employed is chloride of platinum, in 2·5 per cent. solution. Weaker or stronger solutions act well enough, but 2·5 per cent. is best. Of course the eye must be enucleated in the dark room, the lens and cornea removed, and the solution given access to the vitreous. Stern found the outer limbs of the rods coloured an intense orange after this treatment of the "dark adapted" eyes of frogs, cats and rabbits, and dehydration with absolute alcohol, and clearing with xylol did not affect the colour.

J. B. S.

CLINICAL NOTES.

Pupillometer.—There are very many pupillometers in the market, but that devised by Surel (Montpellier) has the advantage of great simplicity, and may therefore be a welcome addition to the list. Within a frame somewhat like a miniature edition of that of an ordinary school slate two threads are stretched. These pass through one aperture at one end and gradually diverge towards the other, forming a figure like the letter V., the limbs of which are about 10 mm. apart at their maximum. Along the side of the frame is a scale showing exactly the degree of separation at each point from 10 mm. to nil. The mode of use it is needless to describe. An obvious source of error is that the pupil is seen under magnification, while the scale is not, but Surel, while pointing this out in a note, is, we think, right in regarding that as not a very serious blemish on the instrument. Clearly, also, one must see that he measures the true diameter of the pupil and not merely some chord.—*Revue Générale d'Ophtalmologie*, July 31.

Extirpation of the Sac.—Elliot finds that the hæmorrhage which causes so much annoyance in the operation may largely be avoided by making the internal tarsal ligament the upper limit of the incision, which should then keep a course well outwards, away from the nose, following indeed the line of the margin of the bony orbit. He employs no special retractors of the lips of his incision.—*Indian Medical Gazette*, August, 1905.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

The President of the Society, Mr. Priestley Smith, in the Chair.

Meeting held October 19th, 1905.

Cases and Card Specimens.

Two Cases of Toxic Amblyopia Cured in Fourteen Days.—Mr. C. Wray.

Case i. Patient came to the hospital on August 20th, and was admitted a few days later, when he was at once put upon Potassium Iodide and was given large quantities of water to drink. The vision at the commencement of the treatment, on September 4th, was $^6/_{24}$? on September 6th it was $^6/_{12}$ one letter, and on September 15th four or five letters of $^6/_6$. The patient had been allowed to smoke a quarter of an ounce each day during the treatment.

Case ii. Patient came under treatment on September 4th, and was treated in a similar manner. The vision on September 5th with correcting glass was $^6/_{60}$? On September 8th it was $^6/_{36}$, and on September 15th it was $^6/_{12}$ and Jg I. This patient also had been allowed to smoke a quarter of an ounce whilst under treatment each day.

Small Rupture of the Retina in the Yellow Spot Region.—Mr. Walter H. Jessop.

The patient, a van boy aged 14 years, had been admitted into hospital half an hour after falling upon a case, the corner of which had struck his left eye. The eye was painful, there was a small perforating wound of the lower lid with congestion of the conjunctiva, and a small sub-conjunctival hæmorrhage; the cornea showed a superficial linear abrasion which stained with fluorescine; a small hyphæma was present, the iris was not tremulous, but the pupil was slightly smaller than the right. The details of the fundus were seen indistinctly, and the vision was $^6/_{24}$. Six days after the hyphæma had disappeared, and a detachment of the iris below was plainly visible. With the ophthalmoscope a small linear scar could be seen near the yellow spot, this was black towards the centre, and yellowish all round, the scar appeared to be quite superficial, and radiating from it were numerous bright white striæ (? folds of the retina. No central scotoma could be found, and the vision had improved to $^{6}/_{12}$. At the present time the vision is $^{6}/_{6}$ the pupil remains flattened below and the coredialysis remains as at first.

THE PRESIDENT'S ADDRESS.

After thanking the Society for having made him President, Mr. Priestley Smith recalled to mind the fact, that with the close of the last Session, the Society had completed the first twenty-five years of its existence, and thought we all had very good reason to be grateful to the "small body of earnest men"—so styled by the late President,—who founded it. In his opinion, men who take to ophthalmic work with but slight experience of general practice are rather too apt to begin with too small a field of vision, to look exclusively at the eyes and too little at the general conditions and surroundings of the patients. For his part he said he now concerned himself much more than previously not only with the medical antecedents of patients but with their habits and ways, their eating and drinking, their smoking, occupations, recreations, and the hours they keep. Also whether they live in dry or damp houses, well or ill ventilated, close or draughty, their mental troubles and anxieties, and matters more intimate. With regard to diet the President said he had lately been considerably influenced by the writings of Haig, and with him he considered that too many of the rich and well-to-do habitually eat too much, and particularly too much flesh, thereby creating for themselves a morbid craving for alcohol and tea. Gouty people are in the habit of overlooking the presence of acids in their food, and the speaker believed he had frequently found common rhubarb to be an unsuspected cause of painful attacks in the eye and parts round it. With respect to alcohol, the writer pointed out that its most conspicuous result among eye disorders was to be seen in the ruptured eyeball of the Saturday night brawl, but a more common one was the hyperæmia of the conjunctiva, not amenable to astringent lotions and often accompanied by more or less proptosis. Another fact which the speaker had on more than one occasion observed was an acute severe interstitial keratitis of long duration, occurring after the indulgence in a drinking bout in a chronic drinker. The President gave it as his opinion that in almost every case it is a mistaken idea on the part of those people who consider they would be much worse in health unless they took alcohol. Tobacco also could be traced as a cause of the trouble amongst minor affections, as well as in the marked cases of toxic amblyopia. The habitual neglect of the bowels he considered to be the counterpart of dietetic errors, and in elderly people this often underlay the onset of acute glaucoma. Again with regard to situation of houses, the damp low-lying house had frequently been found to be the essential cause of a serous cyclitis. In conclusion, the president, while calling attention to the advances daily being made in laboratories—in showing us the natural history of infective processes, and the subtle powers inherent in the blood, and that we may look forward to further great advances,—stated that whatever these might be we should never outgrow the need for looking in our daily work to the simple homely matters just considered.

Notes on a Peculiar Pupil Phenomenon in two Cases of Partial Iridoplegia.—Mr. C. Marcus.

Case i. Patient aged 12. Left eye vision $^6/_6$, pupil normal. Right eye vision $^6/_6$, pupil dilated. Loss of direct and consensual light reflex, the pupil contracts slowly with convergence. Irritation of the cornea as by instillation or drops causes constriction of the pupil, whereas forcible closure of the lids has only a slight effect on the pupil. Dilatation of the pupil after contraction was a very slow process occupying some four or five minutes. The accommodation remained unimpaired, and the knee reflexes were absent.

Case ii. Patient a female aged 33. Right eye vision $^6/_6$ with myopic correction, pupil reactions normal. Left eye vision $^6/_9$ with myopic correction. The pupil of this eye showed similar changes to those in Case 1. On convergence the pupil reacted quite promptly and became smaller than the pupil of the right eye, slow subsequent dilatation taking about 5 minutes. The outer half of the iris presented wider spaces of the stroma suggestive of atrophy. In these cases there appeared to be no true spasm of the sphincter, as the pupil began to enlarge as soon as the accommodation relaxed. However the pupil was made to contract—which it did quite readily—the subsequent dilatation took place slowly. These cases can be classified as instances of unilateral Argyll-Robertson pupils, and the possibility of the patient's having had complete iridoplegia, from which they have only partially recovered, might be an explanation of the phenomena.

Colour Systems.—Dr. Edridge-Green.

The writer began by stating that all colour systems were of two kinds, elemental and non-elemental, and that all the colour systems of the past were elemental, while the only non-elemental colour system was his own, in which it is assumed that light falling upon the eye liberates the visual purple from the rods, and a photograph is formed. The decomposition of the visual purple by light chemically stimulates the ends of the cones and a visual impulse is thus set up which is conveyed through the optic nerve fibres to the brain. These visual impulses differ in character according to the length of the wave of light causing them. The visual centre transmits to the mind impressions of white light and objects are seen monochromatically as in a photograph, the visual centre being acted upon by impulses caused by all rays of light, the colour perceiving centre being concerned with the quality of the impulse. In this theory the visual centre is supposed to have been first developed and subsequently the colour perceiving centre, and in this centre at first few cells were developed which would be able to differentiate only between the largest and the smallest wave-lengths—the red and the violet,—but as this colour sense developed more and more cells became added to the colour-perceiving centre and slighter differences in the wave lengths were appreciated, till the red and the violet more nearly approached one another. Later, instead of only two colours being appreciated a third point of difference became appreciated, and a third colour became developed—green,—between the first two. Still later more points of difference became apparent till the whole of the spectrum became appreciated, and of course in some individuals more colours could be differentiated than in others. Thus the different varieties of colour perception could be classified according to the number of colours appreciated by any individuals in the spectrum, and in each class there might of necessity be many degrees, thus one dichromic might have a colour-perceiving centre of nearly the requisite development to see three colours, but not quite. The statements and diagrams representing dichromic vision as set forth in many text-books as being a simple reduction from the normal by reason of the absence of one set of colour-perceiving elements while the other remain normal. the writer considers quite inconsistent with the facts of colour-blindness. According to the writer's theory there should be different degrees of dichromic vision ranging from a man who was bordering on the trichromic to one who was almost totally colour blind, seeing the spectrum nearly all grey but with a tinge of red at one end and a tinge of violet at the other, corresponding to the degree of defect. The neutral band would alter according to the different degrees of size or development of the colour-perceiving centre. All who have had practical acquaintance with the subject must be aware that all dichromics are not equally colour blind, and if we take a number of similar cases we shall find that colours which are put together by one are emphatically rejected by another, whilst those occupying a relatively nearer position in the spectrum are put together as alike by all. A dichromic bordering on the trichromic, as can be easily understood, would be difficult to detect, and it is precisely these cases which are able to pass the wool-test with ease. A point upon which stress was laid by the writer was, that for colour matches simple compound colours were not physiologically the same. Any colour system must be able to explain the number of colours which one sees in the spectrum, and the variation in number and position which occurs with different persons. According to the author's theory, the normal sighted see six different colours in the spectrum which appear to be primary. On examining the spectrum in such a manner that only a portion of it is seen at one time, it will appear to be made up of a series of monochromatic bands, and these bands differ in size with different persons according to their colour perception, also a person with good colour perception can see about eighteen consecutive monochromatic patches in the spectrum, some more, some less, the colour blind many less. A trichromic sees three colours in the spectrum, red, green and violet, and describes the spectrum as red, red-green, green, green-violet, and violet, the number of his monochromatic patches being considerably diminished. The tetrachromic sees red, yellow, green, and violet, and finds difficulty with blues and greens. The pentachromic confuses orange and red. The explanation of a monochromatic patch according to the writer's theory is that the colour-perceiving centre is not sufficiently developed to discriminate between the impulses caused by the wave lengths included within the patch. There is no definite colour between the blue and the violet. In all cases where the spectrum is shortened there is light as well as colour loss, and the centres of the colour are shifted towards the unshortened side.

A New Form of Spectacle Lens, Invented by Dr. Tscherning, of Paris.— Mr. S. Lindsay Johnson.

Reginald E. Bickerton

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